

## AIR CONDITIONING

### 25 Air Conditioners Installed in 1935 in Richmond, Va.

By T. T. Quinn

RICHMOND, Va.—Air-conditioning installations in this southern city registered an increase of 250 per cent during 1934, with 25 installations reported against a total of 10 in all the years previous to that time.

Activities in the air-conditioning field here last year branched out considerably over former years. Where, prior to 1934, theaters had been the largest single users of air-conditioning equipment, last year saw the application of comfort cooling switch to a greater variety of smaller uses.

Foremost among these were private homes of the city, with 11 installations for a total of 12 hp. reported for last year, as against but one installation of similar type up to that time.

Largest installations reported here last year were in two of the city's department stores, where systems totaling 1,050 hp. were put into use for the comfort of employees and patrons. Another field in which considerable headway was made was offices, three of which last year installed systems totaling 10 hp.

A large drug store installed a system of 15 hp. to give activities in that field their start, and one of the city's major funeral parlors put in a system of 25 hp. Activities in another potentially important field were begun when a hospital installed a system of 5 hp.

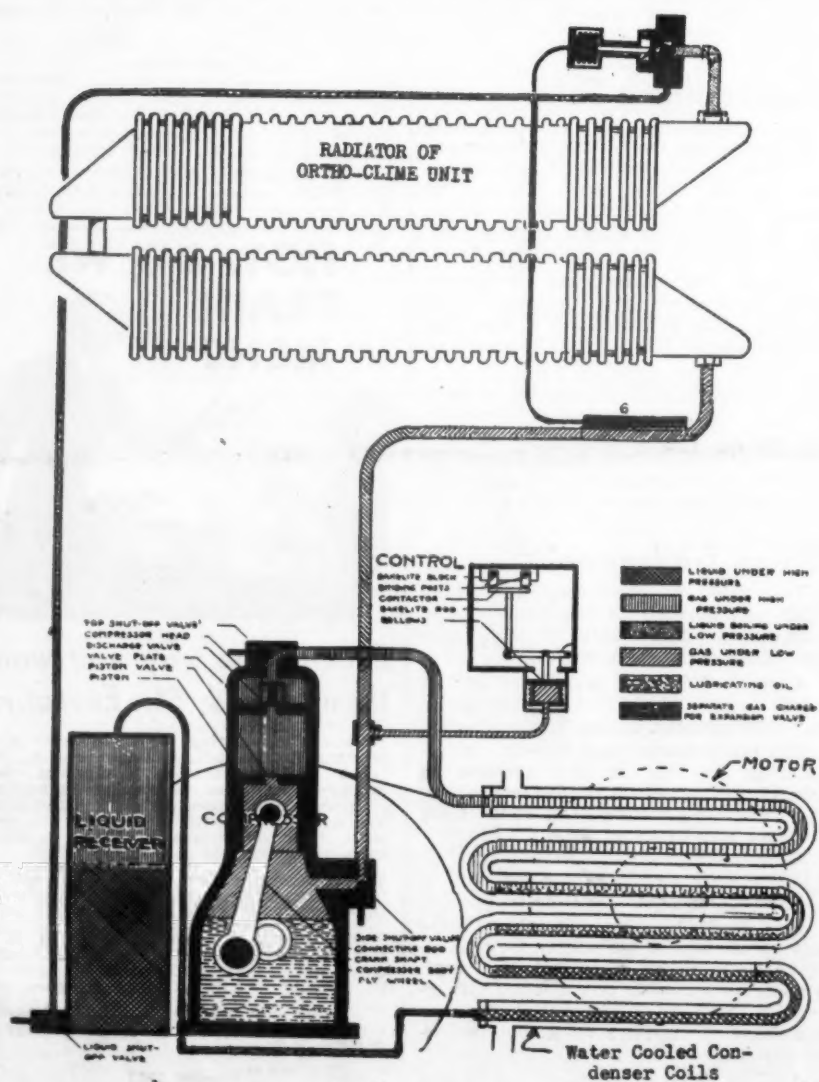
The survey showed that average hp. per installation decreased as the number of the installations rose. This is shown by the following table:

	No. of Installations	Total Hp.	Average Hp. Per Installation
During 1934	25	1,267	50.68
Before 1934	10	1,507	150.7

### Installations in Richmond, Va.

Type of Establishment	Prior to 1934			During 1934			Total Thru 1934		
	No.	Hp.	Tons	No.	Hp.	Tons	No.	Hp.	Tons
Drug Stores	..	..	..	1	15	14	1	15	14
Theaters	4	855	710	1	55	45	5	910	755
Department Stores	..	..	..	2	1,050	750	2	1,050	750
Specialty Stores	1	15	14	3	15	12	4	30	26
Residences	1	12	10	11	12	11	12	24	21
Restaurants	1	15	12	1	45	35	2	60	47
Hospitals	..	..	..	1	5	4	1	5	4
Funeral Parlors	..	..	..	1	25	20	1	25	20
Offices	..	..	..	3	10	8	3	10	8
Banks	1	60	50	..	..	..	1	60	50
Industrial	2	550	475	1	35	25	3	585	500
<b>Total</b>	<b>10</b>	<b>1,507</b>	<b>1,271</b>	<b>25</b>	<b>1,267</b>	<b>924</b>	<b>35</b>	<b>2,774</b>	<b>2,195</b>

### Hookup for Ortho-Clime System



Method of connecting Fairbanks-Morse Ortho-Clime air-conditioning unit to a refrigeration system, showing refrigerant in various phases.

### Fairbanks-Morse Co. Selling Year 'Round Air Conditioner

(Concluded from Page 1, Column 1)

either by manual control of the spray, or by a room humidistat.

Headers, core chamber, and fins of the coils (heat exchanger it is called by the Fairbanks-Morse people) are of one piece semi-steel. Heat transfer is direct to the medium.

It is the large amount of the prime surface (core chamber) as compared with secondary surface (fins) that is a principal feature of this heat transfer element.

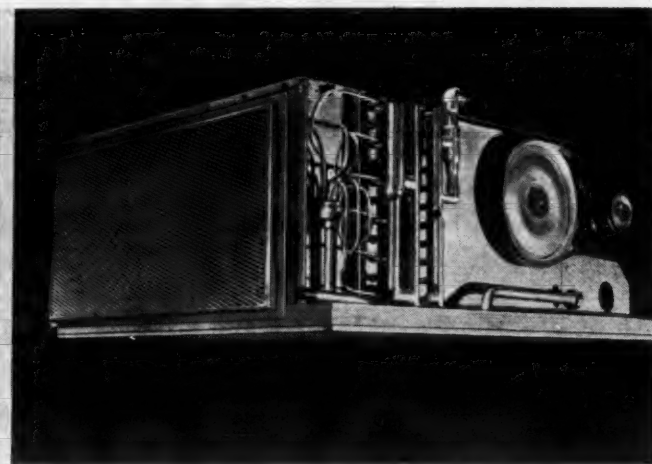
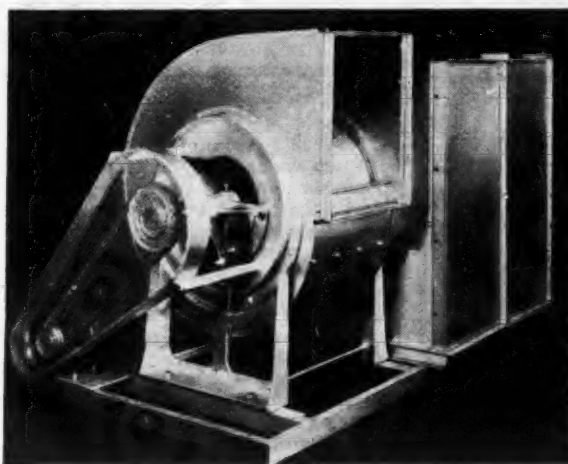
What amounts to two-stage cooling is accomplished in the Ortho-Clime unit. When the air passes over the first bank of coils of the heat exchanger it is dropped in temperature almost to the "dew" point—that is, the temperature at which the air gives up its moisture.

The air then hits the second bank of coils, which because of the "counter-flow" refrigerant arrangement employed in Ortho-Clime, is colder than the first bank. Here the air is dropped further to a temperature considerably below its dew point, its moisture condenses on the cooling coils, and drops to the condensate pan.

Cooling and dehumidification thus take place in the same cycle or in a single passage through the unit. Motor is 1/20-hp. shaded pole type. Motor is equipped with 5-in. double shaft extensions on each of which is mounted a 4"x5½-in. wheel type multiple blade fan with double inlet.

Speed of the motor or the air displacement of the twin blower can be regulated by the simple manipulation of a switch handle mounted on the control box on the low side of the inner cabinet. Provision is made for high, medium, or low speed operation.

## York's New Comfort Cooling Units and Freon Machine



At the left is illustrated York Ice Machinery Corp.'s new 20-ton air conditioner which is designed as a complete factory-built central-type unit for both summer and winter air conditioning. At the right is one of York's new air conditioners for ceiling mounting in the space to be conditioned.

### New Freon Machines and Air Conditioners Introduced by York

(Concluded from Page 1, Column 5)

oilier, air-cooled cylinders, and electric furnace nickel iron cylinders, crankcase, and pistons.

Compressor parts are largely standardized to keep down production costs, and to facilitate service and interchange of parts.

Water valves, "v" belts, a belt adjustment, high pressure cut-out, low pressure control, liquid line strainer, and a suction strainer are standard equipment.

One of the principal new features is the new shell and spiral finned tube condenser which, York engineers state, has greater capacity and improved efficiency over previous condenser designs. The condenser shell is of welded steel construction similar to common practice, but the water coils have spiral copper fins which materially increase the condensing surface.

The tubing is formed into a trombone type coil, without joints or return bends, consequently there is practically no possibility of leaks inside the shell. The entire coil is hot-tin dipped after fabrication to secure a metal bond between primary and secondary surfaces.

By manifolding the coils, designers have minimized the pressure drop of condensing water through the condenser, making it particularly suitable for use in connection with cooling towers, where it is necessary to circulate large quantities of water.

Another new feature is the "vortex eliminator" in the liquid refrigerant outlet from the condenser. This device prevents the formation of a vortex, or whirlpool of liquid, at the refrigerant outlet within the receiver, and eliminates the possibility of gas passing to the expansion valve.

This feature makes it possible to operate with a lower level of liquid refrigerant in the condenser and still prevent gas from entering the suction line.

Of special interest to service and installation men is the new type of positive stainless steel liquid level indicator. It is built of two ball type valves installed in a single valve body, arranged ½ inch apart. Liquid level is maintained between the two valves. Opening the upper valve releases invisible gas, and opening the lower valve releases a dense white cloud indicating liquid refrigerant.

York's new air conditioners, models C-1500, C-2000, and C-3000, with approximate capacities of 15, 20, and 30 tons of refrigeration, respectively, are built for applications such as the larger retail stores, restaurants, etc.

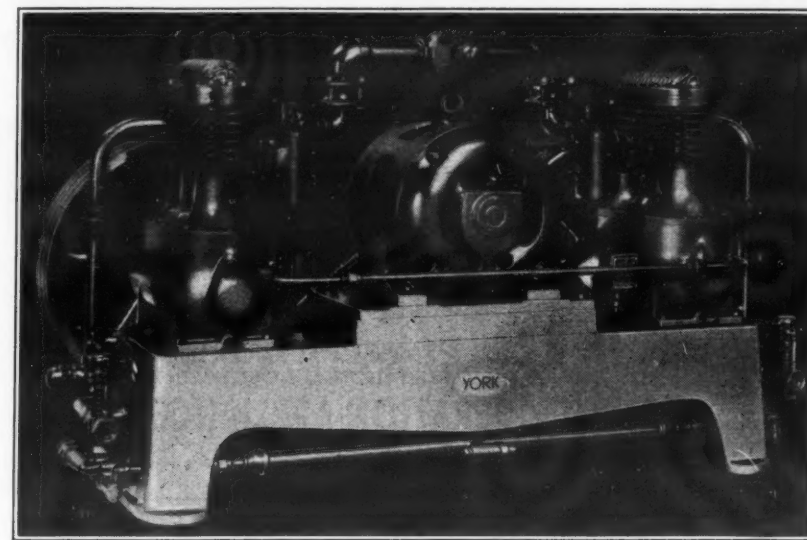
They can be arranged for year 'round air conditioning—cooling and dehumidifying in summer, heating and humidifying in winter, and circulation, filtering, and introduction of fresh air during all seasons. Or they can be furnished for summer operation only.

Model C-1500 is built in two styles, like the smaller units in York's line of air conditioners. When the air conditioner is installed as a unit within the space being conditioned, it is furnished with a decorative casing.

When installed as a central station conditioner in the basement, or any other convenient place outside the conditioned space and a system of air-distributing ducts are employed, no decorative casing is necessary.

This conditioner is provided with mountings for overhead suspension. Air is drawn in through cleanable bronze filters at one end, passed through a bank of bonded corrugated copper fin coils, and then forced by a forward-curved, multi-blade fan through the outlet.

The new 20 and 30 ton models are built to be installed only as central type air conditioners, serving conditioned spaces through ducts. They are developed to meet the demand for a factory assembled, central station air conditioner for relatively large re-



New duplex type 20-hp. "Balanceal" condensing unit which York Ice Machinery Corp. has just introduced to complete its line.

quirements.

Like York's smaller horizontal models, these heavy-duty conditioners have coils for either Freon, refrigerated water, or cold brine. Heating surfaces are designed for either steam or hot water.

Fans are designed to provide low outlet velocities with quiet operation and minimum power consumption. Mounted in supports which were designed for quietness, the motors drive the fan through V-belts. Pulleys are inter-changeable to permit change of speeds to suit special conditioners.

As an optional feature for use where close regulation of air conditions is desired, an automatic by-pass is offered for either electric or pneumatic control. This is recommended for comfort installations to provide better control under partial load conditions.

For industrial applications where even closer regulation of humidity is required, reheating may be furnished in addition to by-pass control.

Specially designed bronze nozzles atomize moisture into the heated air stream for humidification in winter.

### Kroeschell Installs New System for Theater in Chicago

CHICAGO—Installation of year-round air-conditioning equipment was recently designed and installed by the Kroeschell Engineering Co. here in the Apollo Theater, new addition to the Balaban & Katz theater chain.

The air conditioner is located in a room above the auditorium and the single motor-driven carbon dioxide refrigerating unit is in the basement underneath the stage.

Conditioned air for the main floor, balcony, and foyer is introduced at several points in the ceiling and balcony soffit, which insures even distribution without drafts or noise. The ducts are provided with sound absorbing units. Portions of the former ventilating system were utilized in the air-conditioning installation.

Refrigeration is provided by a 125-ton capacity carbon dioxide refrigerating plant.

## REAL CRITICS



### THESE SERVICE ENGINEERS THAT'S WHY THEY PREFER ANSUL REFRIGERANTS

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**ANSUL CHEMICAL COMPANY**  
MARINETTE - WISCONSIN





## REFRIGERATION NEWS

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DETROIT, MICHIGAN, MAY 22, 1935

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Business News Pub. Co.THREE DOLLARS PER YEAR  
TEN CENTS PER COPY**A.S.H.V.E. to Meet on June 17 In Toronto, Ont.****Engineers Will Discuss New Aspects of Air Conditioning**

NEW YORK CITY—Special aspects of air conditioning will be considered by speakers addressing the semi-annual meeting of the American Society of Heating and Ventilating Engineers, to be held June 17 to 19 at the Royal York hotel in Toronto, Ont., Can.

Program for the opening day calls for a discussion of "Characteristics of Registers and Grilles" by J. H. Van Alsbury; and "Classroom Odors with Reduced Outside Air Supply" by F. C. Houghton, H. H. Trimble, Carl Gutherlet, and M. F. Lichtenfels.

Scheduled for the Tuesday, July 18, technical section are addresses on "Cooling and Air Conditioning an Ale Brewery" by C. P. Creighton and F. J. Friedman; "A Field Survey and Test of Intermittent Oil Burner Operation" by D. W. Nelson; and "Design and Operation of the Heating Systems at Mt. Holyoke College" by C. W. Colby.

For the final day the following program has been scheduled: "Study of Air Filters" by F. B. Rowley; "All Electric Heating and Cooling System" by P. Sporn; "Discussion of Certified Air Conditioning" by S. R. Lewis.

A dinner dance Tuesday night, June 18, is the high spot in the program of entertainment which has been planned.

**Wurlitzer to Close Western Stores**

CINCINNATI—Rudolph Wurlitzer Co. will close its retail stores in Los Angeles, San Francisco, and Kansas City on June 1, and concentrate its future efforts on the territory east of the Mississippi river, according to an announcement by R. C. Roling, vice president and general manager of the company.

"During the past several months we have carefully reviewed the advisability of having retail outlets so far removed from our executive offices here in Cincinnati," said Mr. Roling, "and as a result have concluded that it is becoming increasingly difficult to give them the attention they require."

"Our future plans call for further expansion of our retail operations in the Middle West and East, and, therefore, we will concentrate our efforts in the territory east of St. Louis."

In abandoning retail operations in the West, Mr. Roling said, the Wurlitzer Co. would suffer no loss through the closing of the stores in the three cities, as distribution of the company's products is now being handled satisfactorily by other dealers in those cities.

**Two Beginners Sell '35 Quota in 4 Months**

DAYTON—Two Ohio and one Missouri salesmen for Frigidaire Corp. attained membership in the 1935 Frigidaire B.T.U. club by making their 1935 quotas in the first third of the year, reports Frank R. Pierce, sales manager.

One of the salesmen, A. C. Trough, Youngstown, Ohio, began selling refrigerators last October. Prior to that time was an open hearth attendant in the Youngstown steel mills.

J. T. Rice, Akron, Ohio, was a member of the Akron police force until he joined the Frigidaire retail store as a salesman last November.

W. L. Bateman, Willoughby, Inc., St. Louis, has been selling Frigidaire for the last 10 years.

**409 Refrigerators in Use In Athens, Ala.**

ATHENS, Ala.—According to a survey made by H. F. Clark, Athens manager of TVA operations, there are 409 electric refrigerators, 188 electric ranges, and 50 water heaters in use here. Population of Athens is 4,238.

**Service Chief**

EDWARD BARGER  
Will be service manager of  
Universal Cooler Corp.

**Barger Made Service Mgr. of Universal**

DETROIT—Appointment of Edward Barger as manager of the service division of Universal Cooler Corp. was announced last week by Frank S. McNeal, president and general manager.

Mr. Barger left a position as a Kelvinator commercial sales engineer to head Universal Cooler's service operations. Previous to his connection Mr. Barger had been associated with the old Copeland company for eight years, as service manager, executive engineer, and works manager.

Before entering the refrigeration industry, Mr. Barger was engaged in engineering work in the automobile industry, having been with Maxwell-Chalmers and Chrysler Corp.

Mr. Barger is a past president of the Detroit chapter of the American Society of Refrigerating Engineers.

**7,832 Refrigerators Sold by Utility**

CHATTANOOGA, Tenn.—The Tennessee Electric Power Co.'s appliance sales for the year 1934 totaled \$1,824,856, highest in its history. Sales included 7,832 refrigerators and 3,810 ranges.

Of the 7,832 refrigerators sold, 5,100 were TVA-approved models selling at approximately \$79 each. Of the 3,810 ranges, 2,138 were the special TVA designs.

Figures show that an average of 62 per cent of the appliances sold in the territory were the low-cost models introduced through TVA cooperation.

Although the utility financed its own installment sales, the three-year payment period as approved by the EHAFA was put in force.

**Pharmacy Sells 169 Units In Hampton, Ga.**

HAMPTON, Ga.—In this town of 1,002 people located in a county having only 1,800 white families, 169 Crosley electric refrigerators and 20 Crosley electric bottle coolers were sold during 1934 by Cain's Pharmacy, owned by Dr. A. L. Cain, Crosley dealer for Hampton and Griffin, Ga.

Dr. Cain became a Crosley dealer in this territory in 1926 and since that time has sold approximately 2,000 radios and 300 electric refrigerators.

**Campbell Adds to Duties With Rex Cole, Inc.**

NEW YORK CITY—E. H. Campbell, manager, advertising and sales promotion department, Rex Cole, Inc., General Electric home appliance distributor, has been placed in charge of sales to department stores and to public utility companies in New York City, reports Robert Stevenson, vice president and general manager.

The new assignments are in addition to Mr. Hamilton's present duties.

**Crosley Reports \$893,746 Profit For Fiscal Year****Sales Showed 50% Gain Over Previous Year; Profits Double**

CINCINNATI—Crosley Radio Corp. net profit for the fiscal year ended March 31 was \$893,746, equal to \$1.64 per share, it was reported last week.

This compares with a net profit of \$413,107, or 75 cents a share, for the previous fiscal year, an increase of more than 100 per cent.

Net sales for the year were \$15,808,737, compared with \$10,637,365 in the preceding year, a 50 per cent increase.

**'Detroit' Valves Now Use Gas-Charged Power Element**

DETROIT—The Detroit Lubricator Co. has obtained exclusive rights for an improvement in thermostatic expansion valves covering the use of a gas charge in the power element, I. J. Knudson, manager of Detroit Lubricator's refrigeration division, reported last week.

Several models of the "Detroit" valves have used the new principle of gas charging for more than a year and a number of manufacturers of refrigeration systems have adopted the new valves for all applications, Mr. Knudson states.

According to Mr. Knudson, some of (Concluded on Page 30, Column 2)

**Alabama Recants on Heavy Dealer Tax**

BIRMINGHAM, Ala.—The committee on finance and taxation of the Alabama legislature has recanted from its plan to place a heavy license tax on dealers in electric refrigerators, water heaters, and ranges following protests by the Alabama Electric Refrigeration Bureau and the Birmingham Furniture Dealers Association.

Instead of a \$100 tax on dealers in the larger cities the levy will not be more than \$10 to \$25, and may be graduated down in the smaller cities.

Ira J. Randall, secretary-manager of the above named organizations, declared that the higher tax would have forced anywhere from 50 to 75 per cent of the merchants to discontinue the sale of electrical appliances. He added that appliances are usually carried as a side-line and that merchants already have to pay ad valorem and income taxes and that electric refrigerators are subject to a 5 per cent federal excise tax.

**Cooperative Activity Is Factor in Boosting Miami Conditioning Installations 500%**

MIAMI, Fla.—The 20 air-conditioning installations made here during 1934 as compared with only four made in all the years prior to last year indicate that air conditioning has gone ahead by leaps and bounds in this city.

Until June, 1934, there were only three air-conditioning installations in Miami and vicinity. These three installations were in theaters, the oldest having been installed in 1926. Although 20 installations have been made since that time, only one residence and no theaters at all have been equipped with air conditioning.

Largest installations, as reported, were two Miami department stores where systems totaling 112.5 tons and 144.5 hp. were put into use for the comfort of employees and patrons.

Private office installations, numbering three, were foremost from the standpoint of the largest number of air-conditioning jobs in one field. Single installations included a utility, manufacturing company, commercial office, broadcasting office, and a residence.

Air-conditioning equipment was also installed in two funeral homes, two

**Pittsburgh League Sounds Warning On Trade-ins**

PITTSBURGH—Electric League of Pittsburgh is sounding a warning to its members that "trade-in" practices on household electric refrigerators must be controlled, and calls for the establishment of local bureaus to draw up rules for a "trade-in" and service policy.

As one basis for profitable operations where trade-ins are a factor, the Electric League suggests that dealers carefully examine the prospect's box, estimate the cost of reconditioning the same, and then deduct this cost from the estimated resale value and offer the customer the difference as a trade-in allowance.

Maximum allowances which the league believes cannot safely be exceeded are set forth as follows:

Price of Refrigerator	Allowance
\$100-\$125	\$5
\$150-\$195	\$10
\$200 and up	\$15

"A good salesman," says the article in the June issue of the Electric League's bulletin which discusses the matter, "will often make the sale without taking a trade-in by suggesting that the old box will be more valuable to a relative or a charitable institution, than the small amount that could be allowed as a trade-in."

Warning is also sounded against emphasis of trade-ins in advertising, the point being made that if they are advertised, each dealer tries to exaggerate the allowance he can afford to make. Some simple statement like "your old ice-box will be taken in trade" should be all that is necessary, it is argued.

**G-E Gets Order for New Capital Homes**

WASHINGTON, D. C.—Meadowbrook, Inc., home building organization here, has adopted General Electric equipment for use in various building projects in the capital, placing an order for 90 refrigerators, 116 gas furnaces, and 50 electric ranges to cover 1935 building operations.

The order was placed with the Hudson Air Conditioning Corp. of this city.

A large proportion of the equipment will be installed in new homes at "Grasslands," a section of Washington being developed by Meadowbrook, Inc.

**Newark Air Conditioning Show Opens June 3**

NEWARK—The annual Newark air-conditioning show will be held June 3 to 8 inclusive at 70 Park Place here, under the sponsorship of the Public Service Corp. of New Jersey.

**Engineers Open Detroit Meeting This Wednesday****Varied Technical Program Provided; 'Fiesta' Feature Of Entertainment Plans**

DETROIT—Members of the American Society of Refrigerating Engineers gather here this week to listen to and take part in discussions on air conditioning, commercial refrigerating machinery, and progress in refrigerating machine standards; and to be royally entertained by a program planned by the local chapter.

The meeting opens Wednesday, with the sessions being held at the Statler hotel. First day's technical session will be devoted to air conditioning, second day to commercial machinery, and third day to progress in standards.

Highlight of the program of entertainment is the "Refrigeration Fiesta" to be held Wednesday night, May 22, with members of the News staff acting as hosts at a party which will also mark the opening of the addition to the News offices. A full evening's entertainment has been planned.

The welcome luncheon for the engineers and their wives will be held at 12:30 o'clock Wednesday noon at the Statler hotel. Wednesday afternoon the visitors have their choice of a visit to one of three major Detroit industrial plants: Kelvinator, Plymouth, or Ford.

Thursday morning Elizabeth Bright, chairman of the ladies committee and daughter of George Bright, chairman of the Detroit convention committee, has planned a shopping tour for the wives, to be followed by a luncheon at the J. L. Hudson Co. department store.

The council luncheon will be held at 1 o'clock Thursday afternoon. Scheduled for Thursday afternoon is a trip to Henry Ford's famed Greenfield Village.

On Thursday night a dinner and dance will be held at Dearborn Inn, with entertainment being provided by a group of more than 40 Kelvinator employees.

Friday morning the ladies will visit The Detroit Institute of Arts and the Detroit Zoo. Luncheon will be at the Lochmoor Country club, with a golf tournament for members in the afternoon.

Program for the technical sessions is as follows:

**Wednesday, May 22**

10:00 a. m.—First session.  
Topic: Air conditioning.  
Chairman: Harry Harrison, president, A.S.R.E.  
"Window Glass as Insulation," C. D. Haven, Thermopane Co., Milwaukee.  
"Rational Development and Rating of Extended Air Cooling Surfaces,"

**Electromatic Moves To Larger Plant**

CHICAGO—The Electromatic Corp. here has moved its offices and production departments to 2100 Indiana Ave. to provide more room for expansion of its production activities, reports Charles F. Toussaint, president and general manager.

Mr. Toussaint states that the company is now manufacturing a complete line of automatic controls and safety devices for commercial refrigeration and air-conditioning systems, including pressure-actuated condensing water regulators, combination high pressure cut-out and water regulators, automatic expansion valves, solenoid valves, combination high and low pressure cut-out switches, combination thermo and high pressure cut-out switches, compressor unload switches and valves, thermostatically operated water regulators.

Executive personnel of the company, as announced by Mr. Toussaint, is as follows:

B. M. Schutz, secretary and treasurer; Henry Beekly, sales manager; John E. Berkshire, production manager; Mike Lassen, chief engineer.

A complete laboratory and test plant is being installed for testing and conditioning the company's products, Mr. Toussaint states.





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QUALITY  
and  
VALUE!

THAT'S another distinct advantage to the dealer who sells this quality-built Copeland line! The genuine value in a Copeland is instantly apparent even to the most casual shopper. Every part, every item, every detail, is of unquestioned quality.

Copeland dealers find so many selling advantages in Copeland that recent sales in nearly every territory have taken a big jump. Only four Copeland models to handle—each geared to meet the mass market! Concentrate on Copeland if you want to cash in!

Just a few distributor's franchises are still available. Write, or wire, for details.

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Manufacturers of a Complete Line of Household and Commercial Refrigeration

Holden Ave. at Lincoln . . . DETROIT, MICH.

**Copeland**  
DEPENDABLE Electric REFRIGERATION

## Kitchen Co. Develops Invisible Bar-ette

CHICAGO—A recent development by Electric Invisible Kitchen Co. is the Electric Invisible Bar-ette, a portable beverage serving outfit equipped with electric refrigeration and designed for use in hotels, apartments, and homes.

The complete Bar-ette cabinet is 27 in. high, 27 in. wide, and 52 in. deep, and is mounted on castors to permit moving it about. Refrigerator is of 3.5-cu. ft. capacity, with large ice cube capacity.

The outer door of the cabinet contains an In-a-Dor removable serving table, which is concealed in the door when not in use. Two additional outlets are provided for other electrical appliances, such as a mixer or chaffing dish, and there is a pull-out working shelf of wood.

Cabinet of the unit is of furniture steel, welded, and finished in ebony and chrome outside, antique ivory inside, with the refrigerator interior of porcelain.

Bar-ette comes complete with glassware, consisting of six beer or lemonade glasses, six old fashioned glasses, 6 whiskey tumblers, six chrome mixers, two trays, a wine decanter, an ice cube bowl, bitters bottle, jigger, bottle opener, strainer, and corkscrew.

Also new to the Invisible Kitchen line is the Bridge-ette Kompak model No. 4, another portable unit 26 in. wide, 23 in. deep, and 48 in. high, and equipped with an electric broiler stove, bar-ette set (including electric mixer and six glasses), chrome serving tray, in-a-dor serving table, and electric refrigeration, with generous ice cube capacity.

Exterior cabinet finish is in ebony and chrome, with interior in antique ivory. The refrigerator is porcelain lined. Walnut exterior finish is available at extra cost.

## Sales Idea for the Week

By V. E. Vining, Manager of Department Store Sales,  
Westinghouse Electric & Mfg. Co.

I know a fellow who sold Cornelius Vanderbilt a cheap shot gun. Actually talked him into it while Mr. Vanderbilt hesitated between two expensive, high grade models.

At least that is the story he tells me.

He was young then, didn't know Mr. Vanderbilt. He got the idea that his customer was hesitating for reasons of price and, for fear of losing a sale, brought out a cheaper gun, turned on his sales talk and, as he thought, saved a sale.

He later learned that Mr. Vanderbilt was able to buy most anything he wanted.

This salesman has grown up now and realizes several things about that transaction. First, he did no favor to Mr. Vanderbilt who wanted, and was able to pay for the best; second, even big men will take advice, maybe that's why they are big.

There is a lot of talk now days about the tendency of the public to buy only cheap things. This tendency may exist, but it is exaggerated and kept alive to a large degree by salesmen, who themselves have "pricetitis," and are so scared of losing a sale that they talk bargain prices rather than quality.

And it isn't only salesmen.

Look at the papers. Study the advertising and you will get the idea maybe the error may come from higher up.

Don't measure your prospect with your own yardstick—use his.

## Ice Cards Aid Dealer In Finding Prospects For Refrigerators

WAUKESHA, Wis.—"Following the ice man" has provided refrigerator salesmen in many cities with a large number of live prospects. Robert Sinsel, manager of Sinsel Electric Shop here, has changed the system around. His salesmen beat the ice man.

On canvassing days, a Sinsel salesman drives early to the section of the city in which he is to work, and notes the windows in which ice cards are displayed. Every home displaying an ice sign, the salesman knows, is a prospect for an electric refrigerator.

Jotting down the street addresses of these homes, he calls back later with the story of electric refrigeration.

Canvassing of this sort, Mr. Sinsel says, must be done in the early morning hours—before the ice man calls and the window signs are taken down. But it pays big dividends, in his opinion. Not only does this method furnish the names of excellent prospects, but it does so at very little cost.

Mr. Sinsel estimates that his salesmen are able to sell refrigerators to at least 10 prospects out of each 100 secured in this manner. While many do not buy immediately, frequent call-backs pave the way for a sale later.

Estimating that the average salesman can make only from 20 to 35 canvass calls per day, doing a thorough job, Mr. Sinsel considers that his plan, in addition to having time and expense, lines up the best potential prospects.

The average ice user, he says, is always interested in electric refrigeration, and thus is easy to approach. The salesman, knowing at what hour ice is delivered to the home, uses this as a sales argument to point out to the prospect that, with an electric refrigerator, refrigeration will be provided at all times, and the housewife no longer need wait until the ice man reaches her home, to insure proper refrigeration.

This sales argument, his salesmen find, is particularly effective during hot summer weather.

## Anchor Life Names Five New Crosley Dealers

PITTSBURGH—Five new Crosley dealers were recently appointed by the Anchor Life Appliance Co., Crosley distributor in this city.

Newly appointed dealers and men who will direct their refrigeration divisions are: North Side Furniture Co., Farrell, Pa., Mr. Moss; Smith Department Store, Oil City, Pa., Herb Armstrong, merchandising manager, and Ralph P. Held, department manager; Wolf Furniture Co., Altoona, Pa., Herb Wolf; Seigler Furniture Co., Elwood City, Pa., Mr. Mervis.

## Baltimore Dept. Store Adds Westinghouse & Norge

BALTIMORE—Stewart & Co., department store here, has enlarged its refrigeration activities by taking on the Westinghouse and Norge lines in addition to General Electric, with which it re-entered the refrigeration field earlier in the season.

## Crosley Distributor Opens Ball Park

NEW ALBANY, Ind.—The Bensinger-Crosley ball park, sponsored by the Clifford-Bensinger Co., Crosley dealer, and the Cooper-Louisville Co., Crosley distributor, was formally opened here recently with a game between the Bensinger-Crosley team and the Falls City Transfer Co.'s team of Jeffersonville, Ind.

Those officiating at the formal opening of the park, included M. C. Thornton, former state senator, Edward H. Meyer, chief of police, and J. G. Hauswald, mayor.

A concession stand with soft drinks, cooled by a Crosley refrigeration system, is near the grandstand. In the grandstand are the ticket office and a display window exhibiting Crosley electric refrigerators, radios, etc.

At the entrance to the park is an electric Crosley sign, measuring 20 by 10 ft., which is illuminated at night. Painted in colors, it portrays a woman at an open refrigerator illustrating the large caption—"This Much More in a Shelfador."

The park provides a seating capacity of 2,000 persons in the bleachers, and has a grandstand which will seat 500 persons. The playing field measures approximately 400 ft. from home plate to centerfield, 324 ft. down the left field line, and about 300 ft. down right field line.

If the enterprise is a success, Mr. Bensinger says:

"We will inaugurate night baseball at the park and spend an additional \$2,000 to provide the necessary facilities."

## Kelvinator Sales of Air Conditioners 10 Times Greater than 1934

DETROIT—Sales of Kelvinator air-conditioning equipment for the first four months of the present calendar year are more than ten times greater than those for the same period of 1934.

H. W. Burritt, vice president in charge of sales, declared that in addition to sales of equipment for conditioning offices, individual rooms in homes and similar purposes, there has been an increase in the amount of equipment specified for larger installations.

"A change in the public attitude toward air conditioning and a realization that more than mere room cooling is involved, has greatly expanded the potential market this year," Mr. Burritt said. "We note a number of installations where other factors besides temperature control are present, such as noise elimination, air purification, and similar functions which all combine in modern air conditioning."

## Boston & Cincinnati Dept. Stores Sell Crosleys

CINCINNATI—Appointment of R. H. White Co., Boston department store, as dealer for Crosley electric refrigerators was made recently by George N. Collins, reports Dave Rockman, general manager of the company.

Mabley & Carew of this city is another department store which has been franchised as a Crosley dealer, according to Leonard Kellogg, manager of the Crosley Distributing Corp.



## C.I.T. Service is only 6 inches away

A phone call to the C.I.T. Office in your city, or nearby, will promptly bring our representative for a talk about your financing needs.

Learn how C.I.T.'s intimate, close-up type of Refrigerator Financing Service avoids the errors, delays and red-tape of long-range contacts. Have our man explain what C.I.T. Service will mean in overhead economies, bettered collections... and all-around cooperation in making your instalment sales net a satisfactory profit.

C.I.T. Plans cover approved types of mechanical refrigerators and water coolers, as well as electric ranges and air-conditioning equipment. Costs are uniformly low.

## C.I.T. CORPORATION

NEW YORK — CHICAGO — SAN FRANCISCO

Completely Functioning Local Finance Offices in the Principal Cities



THESE C.I.T. LOCAL OFFICES  
WILL WELCOME YOUR INQUIRY

Abilene - Akron - Albany - Altoona - Amarillo  
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Baltimore - Bangor - Bay Shore - Beaumont - Beckley  
Binghamton - Birmingham - Boise - Boston  
Bridgeport - Bronx - Brooklyn - Buffalo - Butte  
Camden - Cape Girardeau - Cedar Rapids  
Charleston - Charlotte - Chattanooga - Chicago  
Cincinnati - Clarksburg - Cleveland - Columbia  
Columbus - Cumberland - Dallas - Dayton - Denver  
Des Moines - Detroit - El Paso - Erie - Florence  
Fort Wayne - Fort Worth - Fresno - Glens Falls  
Greensboro - Greenville - Hagerstown - Harrisburg  
Hartford - Hempstead - Hickory - Houston  
Huntington, W. Va. - Indianapolis - Jacksonville  
Jamaica - Jamestown - Jersey City - Johnson City  
Kansas City - Knoxville - Lexington - Lincoln  
Little Rock - Los Angeles - Louisville - Manchester  
Memphis - Miami - Milwaukee - Minneapolis  
Mobile - Montgomery - Montpelier - Mt. Vernon  
Nashville - Newark - Newburgh - New Haven  
New Orleans - New York - Norfolk - Oklahoma  
City - Omaha - Orlando - Paducah - Paterson  
Peoria - Perth Amboy - Philadelphia - Pittsburgh  
Pittsfield - Portland, Me. - Portland, Ore.  
Portsmouth - Poughkeepsie - Providence - Raleigh  
Reading - Reno - Richmond - Roanoke - Rochester  
Rome, Ga. - Sacramento - St. George - St. Louis  
Salt Lake City - San Antonio - San Diego  
San Francisco - San Jose - Scranton - Seattle  
Shreveport - Spartanburg - Spokane - Springfield  
Mass. - Springfield, Ohio - Stockton - Syracuse  
Tampa - Toledo - Tucson - Tulsa - Utica - Washington  
Watertown - Wheeling - White Plains - Wichita  
Wilkes-Barre - Wilson - Yakima - Youngstown



# The ONE complete line



**T**HERE'S more profit for the dealer who concentrates on ONE line of refrigerators. Sales effort is centered. Manufacturer cooperation is protected. Stock turnover is much greater.

General Electric makes a *complete* line of refrigerators—any style, any size, any price. The G-E refrigerator dealer has no need for other lines to complete his price range or display. His stock turnover averages *12 times a year* instead of the usual 6 or 7.

The G-E refrigerator line has everything the prospect wants—unequalled performance—10% to 50% lower operating cost—distinctive styling—all-steel cabinets—every practical convenience feature—and the famous

G-E sealed-in-steel mechanism with 5 Years Performance Protection.

In addition to refrigerators General Electric manufactures the only complete line of electric home appliances—ranges, dishwashers, water heaters, clothes washers, vacuum cleaners, ironers. All are PLUS values to the G-E refrigerator dealer.

This is the Age of Electrical Living and the General Electric franchise gives you **EVERYTHING** necessary to supply the needs of every wired home in your community. Where could you find a better opportunity? Write or wire **NOW** while it is still open to you. General Electric Co., Specialty Appliance Dept., Section DF52, Nela Park, Cleveland, Ohio.

**GENERAL  ELECTRIC**  
ALL-STEEL REFRIGERATORS



## Gets Large Order



CARL CRAMOLINI

## 500 Gilfillans in Seeger Cabinets Sold to Apts.

LOS ANGELES—Five hundred specially designed Gilfillan electric refrigerators, with cabinets by Seeger, have been placed in more than half of the new buildings in a real estate development here. Two hundred more of these refrigerators have been sold for the same development.

Carl Cramolini of Gilfillan Bros. got the order for these units.

Gilfillan refrigerators with cabinets by Seeger have been placed in homes of the following movie stars during the past years: James Cagney, Warner Baxter, Wallace Beery, Jimmy Durante, and Stan Laurel.

## 70 Appliances Sold At Cooking School

CARTERSVILLE, Ga.—Seventy major appliances—51 refrigerators, 15 ranges, and four water heaters—were sold during the three-day free cooking school conducted here recently by the home service division of the Georgia Power Co. in cooperation with the Cartersville Tribune-News, the Parent Teachers Association, and four local refrigerator and range dealers, reports John W. Dent, Cartersville city manager.

Miss Fern Snider, home service director for the Georgia Power Co., and Miss Mary Norman, Rome division home service supervisor, shared the programs of the cooking school, which was the first promotion of its kind in Cartersville.

The Georgia Power Co. wholesale electric current to Cartersville, which was the first wholesale town in the state to have its retail electric rates low enough to meet TVA approval.

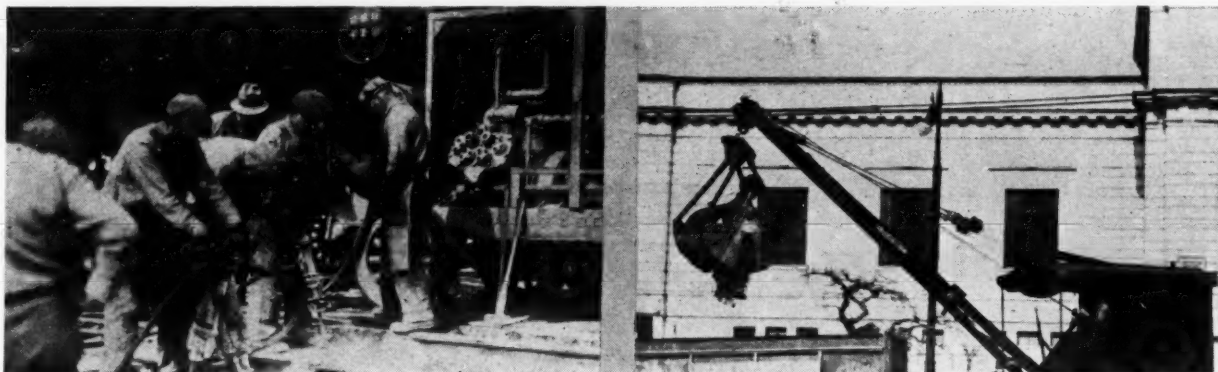
## Coe Addresses Crosley Dealers in Rochester

ROCHESTER, N. Y.—Charles Francis "Socker" Coe, well known writer and speaker, addressed dealers and salesmen at the meeting which opened the ten-weeks sales campaign on Crosley electric refrigerators being conducted by the Erskine-Healy, Inc., Crosley distributor here, reports Ray F. Healy.

The meeting was held Monday, May 6, in the Rochester Gas & Electric Auditorium. An afternoon sales conference was held at the Belvedere Grill.

This was followed by a dinner, entertainment, and a talking picture on Crosley features.

## What to Avoid in Detroit



A.S.R.E. members who are in Detroit for the national spring meeting will find the city's main artery—Woodward Ave.—torn up. The street is being widened, at last. Above are samples of the operations which so fascinate onlookers—but which, editors of the News hope, won't spoil attendance at A.S.R.E. sessions.

## A.S.R.E. Opens Detroit Meeting Wednesday; 'Fiesta' Featured

(Concluded from Page 1, Column 5)

H. B. Pownall, York Ice Machinery Corp., York, Pa.

Thursday, May 23

10:00 a. m.—Second session.

Topic: Commercial machinery.

Chairman: George B. Bright, past president, A.S.R.E.

"Refrigerated Display Windows," H. C. McPherson, Kroger Grocery Co., Cincinnati.

"New Investigation of Absorption Refrigeration," B. H. Jennings, Mechanical Engineering Department, Lehigh University, Bethlehem, Pa.

"Motor Truck Refrigeration and Fuel," Guy L. Tinkham, McCord Radiator & Mfg. Co., Detroit.

Friday, May 24

10:00 a. m.—Third session.

Topic: Progress in standards.

Chairman: S. C. Bloom, vice president, A.S.R.E.

"Industrial Machine Standards," A. B. Stickney, Chicago.

"Testing the Capacity of Expansion Valves," D. D. Wile, Detroit Lubricator Co., Detroit.

Local committees in charge of the convention are as follows:

Hospitality (registration): Dan D. Wile (chairman), F. E. Riley (vice chairman), R. M. Hyde, R. M. Jamison, John Klabon, C. M. Lee, H. J. Scullen, C. L. Toonder.

Program: Hugh E. Keeler (chairman), Chas. Thomas (vice chairman), Edward Heitman, P. M. Johnson, G. R. Kingston, A. E. Knapp, J. E. Naegely, L. A. Philipp, W. A. Wagstaff.

Transportation: A. D. McLay (chairman), D. P. Heath (vice chairman), J. C. Buchanan, R. W. Doeg, W. C. DuComb, S. J. Harry, R. M. Martin, E. M. May.

Entertainment: F. M. Cockrell, (chairman), John Wyllie, Jr., (vice chairman), A. D. Althouse, M. N. Austin, P. W. Baker, E. J. Baluff, G. L. Ohmart, T. A. Ollila.

Recreation: I. J. Knudson (chairman), Emmet J. Mueller (vice chairman), Edward Barger, G. W. Mason, I. H. Reindel, G. F. Taubeneck, R. L. Wells.

Dinner and Luncheon: Frank West (chairman), Matson C. Terry (vice chairman), W. G. Nagel, T. H. Nutter, J. M. Oberc, B. L. Quarnstrom, B. E. Tiffany, W. H. Jacques.

Ladies: Elizabeth Bright (chairman), Mrs. Hugh Keeler (vice chairman), Mrs. Dan Wile, Mrs. F. M. Cockrell, Mrs. Emmett Mueller, Mrs. Dan Ellis.

## Westinghouse Sales Up 200% in 1st Quarter

MANSFIELD—Westinghouse Electric & Mfg. Co. during the first quarter of 1935 shipped approximately 200 per cent more refrigerators than for the corresponding period of 1934. R. C. Cosgrove, manager, household refrigeration sales, declared last week.

Westinghouse has set its electric refrigeration sales quota 40 per cent higher than the 1934 mark.

## New Catalog Issued on Standard Ranges

TOLEDO—Just off the press is Catalog No. 35 issued by the Standard Electric Stove Co., showing the complete line of Standard Electric ranges and other electrically heated products manufactured by that company.

Description, specifications, and illustrations of the complete line of electric ranges are given in the 32-page catalog.

## Boe Promoted to New York Westinghouse Office

EAST PITTSBURGH—H. F. Boe has been appointed assistant eastern district manager of the Westinghouse Electric & Mfg. Co. with headquarters at Rockefeller Center, New York City.

## Reedley, Calif. Paper Conducts Survey on Refrigerators in Use

REEDLEY, Calif.—Electric refrigerators are a part of the kitchen equipment of 265 families in this community of 2,589 persons, according to a survey completed recently by the Reedley Exponent, local weekly newspaper.

The figures, obtained by the newspaper in a canvass of the city and its immediate trade territory, showed the General Electric refrigerator to be first choice, 62 people in the city and 41 in the trade territory outside owning units of this make.

Next was Frigidaire, with 47 owners, 18 in the city proper and 29 outside. Norge was third in preference, with 24 owners in the trade area. Other makes, in the order of preference in the community, are: Majestic, 13; Grunow, 13; Electrolux, 10; Kelvinator, 7; Westinghouse, 7; Crosley, 6; Leonard, 6.

The balance of refrigerators in the community is made up of Servel, Moore, Stewart-Warner, Copeland, Kearney, Zerolite, Belding-Hall, O'Keefe & Merritt, Mayflower, Montgomery-Ward, and Trukold.

Five hundred forty-eight residents, the survey revealed, are using ice for refrigeration.

The investigation, which covered practically all of the community's buying habits, showed that 647 persons owned washing machines, 315 of these residing in the city and 332 in the immediate trade area.

One hundred sixty-two families in the territory own electric ranges.

## Insulite Brings Out New Insulation Board

MINNEAPOLIS—For use by cold storage contractors and applicators, Insulite Co. is now marketing a line of cold storage insulation board products, reports K. T. Batchelder, manager of the cold storage insulation sales division of the company.

Insulite cold storage insulation is 25 per cent lighter in weight than standard Insulite building board, has stronger strength, and can be applied in large sheets, he states.

"Sealdslab," an Insulite cold storage insulation, is protected against moisture absorption by a uniform asphalt impregnation of all exposed sides and edges, which provides a base for the final asphalt coating applied on the job, declares Mr. Batchelder.

## \$70,000,000 Volume on Air Conditioning Predicted

SALT LAKE CITY—That expenditures in the air-conditioning field for 1935 will total \$70,000,000 is the belief expressed by H. C. Porter of the air-conditioning department of the Kelvinator Corp. of Detroit, who spoke before the Salescraft Club here.

## Vacuum Cleaner Drive Sets High Saturation in Philadelphia

PHILADELPHIA—A one-month vacuum cleaner sales campaign recently completed by 19 manufacturer and distributor members of the Electrical Association of Philadelphia resulted in the sale of 2,870 new floor model electric cleaners, and a 72 per cent saturation of the electric cleaner market in the Philadelphia territory, reports George R. Conover, managing director of the association.

The campaign was set up and organized on the basis of a quota of 2,000 sales. Of the total of 2,870 sales made, three distributors with direct selling organizations and selling electric cleaners only, realized 41 per cent of the total; 15 distributors selling other electrical appliances in addition to electric cleaners and depending entirely on the retail dealer as a sales medium, sold 56 per cent; and the utility company, selling 10 different makes of electric cleaners, received 3 per cent of the total.

Promotion for the campaign was built around a premium of a table lamp which was given free with every electric cleaner sold by manufacturer or distributor members of the association through their retail dealers or salesmen during the campaign period.

Sales helps included display advertisements in the Philadelphia and suburban newspapers, a series of radio broadcasts directed to the housewives in the campaign area (including Bucks, Chester, Delaware, Montgomery, and Philadelphia counties), and window cards and folders, showing the premium lamp in full size.

## BARE COMPRESSORS

FOR ASSEMBLERS AND SERVICE REPLACEMENT



Precision made, and of the same approved design and construction that have made the "M&E" complete line famous from coast to coast for efficiency and durability. Ninth Successful Year!

Write For Complete Catalog

**MERCHANT & EVANS CO.**  
MANUFACTURERS  
PHILADELPHIA  
EST. 1866 - Plant: LANCASTER, PA.

## AMERICA'S FASTEST SELLING COMMERCIAL SPECIALTY

# The 'SUPER COLD'

## Ice Cream Freezer and Hardener

And priced so that the extra profit the user makes from only 3 gallons of ice cream will make the monthly payments. Fine ice creams can be made with this Super-Cold for 40¢ to 50¢ per gallon while the average wholesale price ranges from 85¢ to \$1.30 per gallon.

A virgin field with hundreds of interested prospects in every community. Grocers, Druggists, Confectioners, Hotels, Hospitals, Construction Camps, Dairy Stores, Bakeries, Malt Shops, Ice Cream Stores, Passenger and Warships, Schools, Colleges and Institutions.

Exceptionally low wholesale prices permit the dealer to make tremendous profits without losses due to price cutting or trade-ins. Super-Cold freezers are being installed weekly on battleships and cruisers. Over 1300 dealers in 42 states and 36 foreign countries are making big money from Super-Cold sales. Write to the factory for the dealer proposition.

## Commercial Refrigerator Mfg. Co. Ltd.

1020 East 59th St., Los Angeles, Cal.

Branches and Warehouses at New York, Chicago and Portland, Ore.

## SMART, ATTRACTIVE INTERIORS

## Sell REFRIGERATORS

"Hoosier's" newly developed Aluminum Finishes are different . . . distinctive sales stimulants. "Hoosier" works with you also in matters of design. Our specialties are:

EVAPORATOR DOORS  
VEGETABLE PANS  
FOOD STORAGE PANS  
SERVICE DOOR FRONTS  
ICE CUBE AND DESSERT TRAYS

Choice of finishes include our special Aluminum Finishes, Chrome Plate, and Stainless Steel. All inquiries given prompt attention.



## HOOSIER LAMP & STAMPING CORP.

Evansville, Indiana



# Be sure the name

# FRIGIDAIRE



## is on the refrigerator you sell

Public preference for Frigidaire is being increased by the most impressive advertising campaign in Frigidaire's history. • It's always easier to sell people what they want than to argue with them.

**-AND ONLY THE GENUINE FRIGIDAIRE IS THE GENERAL MOTORS REFRIGERATOR**



## PERSONALITIES

By George F. Taubeneck

### Detroit Is Puzzling

PHIL REDEKER says that there are but three seasons in Detroit: July, August, and Winter. He also quotes somebody to the effect that "spring is a nice day in Detroit, too." True it is that Detroit's weather is a puzzle and, except in summer, almost an abomination.

Lots of other things about Detroit are hard to understand or appreciate. Visitors are stumped by the crazy-running streets, and insist they get lost worse in Detroit than any other American city.

Like residents, however, they appreciate the ease and speed with which one can get around town—a blessing which is not unmixed for those who live or have lived in New York City or Chicago.

For visiting A.S.R.E. men this week—and for all the others who come here—this guide has been prepared. We think it is fairly complete, albeit sketchy. And we hope it will help you appreciate some of the things that make us like Detroit.

Perhaps it will be easier to understand Detroit's present somewhat confusing set-up if we turn hurriedly through a few leaves of history. The visitor should always remember, for instance, that Detroit was originally a Canadian city, and that even today the proximity of Canada makes that influence strongly felt.

### Some Early History

The first authentic description of the Detroit region was recorded by Father HENNEPIN in 1679, after he had accompanied LA SALLE to Green Bay in the "Griffin," first vessel on the Upper Lakes.

So impressed was Father Hennepin with the beauty of the country that he attempted to get La Salle to make a settlement on the "charming straight."

But the "straight" lay directly in the war-path of the Iroquois Indians, who made frequent excursions into the West, and so La Salle wasn't inclined to listen to his companion.

CADILLAC, in command at Fort Michilimackinac (now known as Mackinac), from 1694 to 1697, frequently strained an ambitious eye toward the strait. While stationed on the Bermuda-like island of Mackinac he conceived the idea of building a post on the Straits. This post, he envisioned, would be a stronghold of French power, a check to the Westward advance of the British, and a barrier to the Iroquois on their Western raids.

French officials in France and Canada, however, opposed the establishment of a post so far inland. Particularly did the King of France object to such a venture.

Notwithstanding such distinguished opposition, Cadillac won the argument; and on July 24, 1701, he and his party entered the Detroit River and anchored their boats along the shore which is now a part of the City of Detroit. They immediately selected a site for a fort, and two days later the foundation for a church was laid.

The settlement founded by Cadillac in 1701 was not known as Detroit. It was called "Pontchartrain," in honor of Count Pontchartrain, French Colonial Minister of Marine. Through the operations of common parlance, however, by 1710 the village of Pontchartrain had begun to be known as "Detroit," the French word for "Strait."

For the first 60 years after its founding, Detroit was under the rule of France. It grew scarcely at all at first, and six years after its establishment had only 270 inhabitants. The hamlet occupied less than four small city blocks in the vicinity of what is now Jefferson and Griswold St.

Michigan was in those days such a densely wooded section that land travel was impossible. All transportation was carried on by way of the Detroit River and the Great Lakes, which were then known as "The Five Lakes of Canada."

War between England and France changed the destiny of Detroit while it was just a struggling village hugging the water-front, isolated from its own countrymen and fearful of marauding Indians that surrounded it. On Nov. 29, 1760, Detroit was surrendered to the British, who remained in possession until after the Revolution.

James May, a pioneer Detroit merchant, reported in 1778 that the population of the village was mostly French-Canadian, with 30 Scotchmen, 15 Irish, and a few English. There were in all 60 houses, mostly one-story log cabins. Twenty of the inhabitants kept retail stores.

Detroit was nearly a century old when, for the first time, the American

flag flew over the town. A bronze tablet now marks the site of the English fort which was evacuated by the British on July 11, 1796, and over which the American flag was then raised. (To view this tablet, walk southward from the Statler hotel along Washington Blvd. to Michigan Ave., turn east, passing the side of the Book-Cadillac hotel, and thence to Shelby St., going southward until the new Post Office building is reached. On the south, or Fort St. entrance, is the tablet which marks the spot where American occupancy of Detroit began.)

Fire obliterated the town of Detroit in 1805. Historical records state that one building remained standing. Plans for the new Detroit included streets and boulevards of a width that have borne the traffic of a great city, the amazing flow of which the automobile-less pioneers could hardly have visualized.

Woodward Ave., Detroit's Main Street, had to be widened early in 1835, much to the discommodation of motorists and taxis, and to the discomfiture of property owners who had to set their buildings back. It had proved too narrow to accommodate the dense stream of traffic that flows to and from the downtown business section of the city.

Jefferson Ave. was the principal residential street in 1827. Low-built houses of French architecture lined both sides of the avenue. Only two of them were of brick. There was not a paved or macadamized street in the town. Sidewalks were almost as scarce. There were numerous private schools, but no public school was opened until 1838. Several seminaries and colleges had been established by that time, although the enrollments were not large.

The French settlers built a church before they built homes for themselves; and by 1838 there were four churches in Detroit. There were also four banks.

Detroit cannot boast such historic buildings as are to be found in rich-in-tradition cities as Philadelphia, Boston, and New York City, even though Detroit is one of the oldest metropolises in this young nation. The fire of 1805 destroyed everything. Tablets, or markers, have been placed where most of the buildings of historic significance once stood, however, and a fairly clear conception of early Detroit may be had from visiting these points—if your imagination has had its spark plugs cleaned and is hitting on all eight cylinders.

### Exploring Old Spots

If you want to spend an afternoon walking around to see the spots-of-interest (including the markers) here is a guide for you.

Extending down the center of Washington Blvd. from Park to Michigan Ave. is Washington Blvd. Park. At the north end is a statue of Columbus, donated by the Italians of the city.

There are a number of interesting points within walking distance of the Statler, or any other downtown hotel. For instance, a block down Washington Blvd., a turn to the left for one block and a turn right onto Griswold St. (if you aren't lost by this time it won't be our fault) brings one to Capitol Square Park, a triangular space that was once the site of the old capitol building before Lansing became the state capital. This building was destroyed by fire in 1894.

Your imagination gets a little help here, however, for the park contains a statue of the first governor of the State of Michigan.

Continuing down Griswold to the corner of Fort St., you'll find a tablet commemorating the Fox Indian War. This marker has been placed at the southwest corner of the intersection, on the Fort St. side of the Moffat building.

At the southwest corner of Griswold St. and Jefferson Ave., on the Michigan Mutual Life Insurance Co.'s building, is a tablet reminding of the Conspiracy of Pontiac, Indian chief who sought to surprise and massacre the people in 1763. His plans were ascertained in advance and the garrison saved. For a good reconstruction of the situation resulting from Pontiac's conspiracy, see the admirable painting by Gari Melchers in the Detroit Public Library, Woodward at Kirby. Take Woodward street car (or red bus) north, and get off at Kirby.

About a block and a half west of the Pontiac marker, on the north side of Jefferson Ave., is a tablet which bears an inscription stating that this was the starting point of the disastrous fire of June 11, 1805.

Turning east on Jefferson, the site of the Old Council House is soon reached. It was used as Court House, Military Headquarters, and for Town Meetings. The building was destroyed

by fire in 1848. (Seems like a good fire department was one of Detroit's earliest needs.) The marker is on the building formerly occupied by the offices of the Detroit Water Works, southwest corner of Jefferson and Randolph St.

Other points of interest out Jefferson are not within normal walking distance, but may be reached quickly by street car or bus. There is, for one thing, the largest stove factory in the world at Jefferson and East Grand Blvd. The enormous stove (it was built for the 1893 Chicago World's Fair) which sits majestically in front of the factory will be seen as the factory is reached.

The stove works were originally located on the site of what was known as "Bloody Run," and was the scene of a horrible massacre which followed close upon the Indian outbreak known as "Pontiac's Conspiracy."

Assuming that points of historic interest should be included in one tour, we turn back now to downtown Detroit (leaving Jefferson Ave. at Bates St.) and then north to Larned St. to reach the site of the first building of the University of Michigan.

There is a tablet on the east wall of the building, on the northwest corner, which explains that this was the original home of the University of Michigan. It was also the meeting

### Guide to Detroit

For A.S.R.E. members and their wives, here for the annual spring meeting, the following guide to Detroit is offered—in hopes that our visitors and guests will stay over the week-end to get acquainted with this great city of ours.—The Editor.

place of Detroit's first public Sunday School class, which convened to read John 3:16 in unison early in the year 1818. In 1837 the University of Michigan was moved to Ann Arbor.

Walking north on Bates St. for two blocks brings us to Cadillac Square. One block east is the Wayne County building, at the entrance to which is a tablet which bears tribute to Maj. Gen. Anthony Wayne, the dashing "Mad Anthony," to whom the British surrendered this region on July 11, 1796. Wayne County was named in his honor.

Returning to Cadillac Square, you'll notice the Barium Tower, which is tall enough easily to catch the eye. On the 23 floor is an interesting and comprehensive historical museum representing the history of Detroit and Michigan.

This museum is open daily, except Sunday, from 1 to 5 p. m. There is no admission charge. Drop in there and save yourself walking the rest of this trip. But if you're curious:

From Barium Tower to the City Hall is only a short saunter westward, along Cadillac Square. City Hall is a weathered old sandstone building of Italian architecture, built in 1868 for offices of the city officials. It is still serving its original purpose.

Campus Martius (which could be translated to mean "soldier's field"), the area directly east of City Hall, was provided for in Governor Woodward's plan of the city. It was named for the principal square in Marietta, Ohio, the first capital of the old Northwest Territory. Across from the City Hall is the Soldiers' and Sailors' Monument, erected in 1871.

### Present-Day Detroit

Proceeding north on Woodward Ave. from City Hall, Grand Circus Park pops up as a welcome patch of green restfulness set amidst the downtown business section. Long ago it marked the northern boundary of the city.

Originally intended as a "Grand Circle" or "Circus" it never became more than a half-circle; but it does supply the breathing space its creators intended it should. It is separated into an East and West park by Woodward Ave., which bisects it. The Hazen S. Pingree monument by Schwartz in the West Park, and the William H. Maybury monument by Albert Weinman, in the East park, lend a dignity to the spot which is frequently broken by the shouts of long-haired communist breast-thumpers.

Having reached Grand Circus Park, we are now back at our starting point, for the Statler hotel overlooks the Park on the west side.

All theaters, and several places to eat and drink, are within convenient walking distance of the Statler, but for places to be seen in the daytime, it will perhaps be necessary to take a taxi, bus, or street car. Sight-seeing buses have as their starting point the east side of Grand Circus Park, scarcely a block from the hotel.

Detroit's Art Center is worth all the time you can give it. Take a red bus on Woodward and get off at the Art Institute, or a Woodward street car

and get off at Kirby. There you'll see, facing each other across Woodward Ave., the Art Institute and the Main Building of the Detroit Public Library.

The Art Institute is one of the few municipally owned museums in America. It is also universally conceded to be one of the finest examples of architectural perfection to be found in these United States. Its spacious rooms will be found to contain paintings, tapestries, potteries, and almost countless other objects of art from antiquity to the present day. Medieval art is particularly well represented.

If your time is limited and you had rather see Titian's glorious masterpieces than modernistic contemporary paintings, or vice versa, there are courteous attendants to assist you or, if guides of any type annoy you, you will find the entrance to each room clearly marked with a sign and information on the particular period of art which it contains.

Two things you will certainly want to see while there are Whitby Hall and the Diego Rivera Frescoes. Whitby Hall is a famous old Colonial mansion brought from Philadelphia and set up, a house complete, in the museum. It is a fine and authentic sample of Colonial architecture at its best.

### The Rivera Murals

Rivera's frescoes, one of the most cussed and discussed works of art of modern times, cover the walls of the Garden Court, on the main floor of the museum. You'll either like them a great deal or dislike them vigorously; there seem to be no lukewarm opinions about Rivera's work. For months after their unveiling a bitter controversy over their fitness for public gaze raged in Detroit, a controversy that led hundreds of thousands to visit the institute who might not otherwise have been persuaded.

We're going to pause right here and now to examine and consider these murals, for they constitute Detroit's outstanding contribution to art.

Diego Rivera himself has explained his work by saying that he aims at "monumental realism" (which is a phrase, even to a dub in art, that seems to be self-explanatory, particularly after you've seen these gigantic murals). No one can doubt that the frescoes achieve that.

Stand as far away as you can for the best perspective. The story begins with the big panel on the north wall. In this panel you see every essential stage in the manufacture of the automobile motor.

How so strung-out a process has been scaled down to such little space is an achievement worthy of more credit than the casual observer will likely bestow. The artist spent weeks in Detroit automobile factories before he undertook these frescoes.

In the foreground of this first panel, be sure to notice the different types of laborers the artist has portrayed. There is a New Hampshire Yankee, a Texan, a Pole, a Negro, a Mexican, a London Cockney, and a Bulgarian. Doubtless he saw all of these in Detroit factories.

Next turn to the panel on the South Wall. Here are portrayed the presses that fashion automobile bodies. On the left a press is turning out sides and doors. Men in the foreground are polishing the newly made sides. In the top center auto bodies are being assembled. In the upper left corner men are putting on the finish with a spray. In the right, they are testing the spark plugs and ignition system.

Notice, too, the group of spectators in this south wall panel. A guide is showing them through the factory. Here again the artist has drawn from life with a fidelity which seems positively photographic.

In the lower right-hand corner of this panel, you will see two men. The man on the left is Edsel Ford, who gave these frescoes to the Art Institute, and the other is Dr. William R. Valentiner, director of the museum.

At the top of the side walls are four gigantic reclining figures. They represent the four races that have helped to build the distinctly American civilization.

Each figure is cleverly generalized to represent the race as a whole, rather than individual. The White race: keen, nervous, restless, full of driving energy, troubled looking. The Negro is patient and melancholy. The Indian: Sphinx-like, stolid, yet burning with an inner spirit. The Chinese is calm, self-assured, intelligent.

In the right-hand corner of the north wall you can discern science in a beneficent role. In the upper left, you see it as a destructive force. Here the artist asks you, "Progress or Destruction—which?"

At the top of the south wall, left, you see the drug and medicine works of Detroit. Here you will note that women play their role in industry. Girls are pictured as making pills. In front of them sits an executive, surrounded by all the mechanical and scientific aids to modern business which can be found in the catalog. Just beneath is a panel representing surgery.

Aviation is pictured in the three

panels on the west wall. The long panel represents Transportation. Here you see the Detroit River, with freighters gliding on its surface.

On either side of the west entrance, the two kinds of physical power used in industry, and the two kinds of mechanical power, are represented. One side shows steam; the other, electricity.

Below are the mechanic (who uses skilled hands), and the inventor, who uses a skilled brain. The latter, you may be interested to know, is a composite likeness of Thomas Edison and Henry Ford.

At the top of the east wall, the women with armfuls of fruit and grain are symbolic of agriculture—which, according to Henry Ford, is due to play a role of increasing importance in modern industry.

The theme of the artist's frescoes is summarized for you in the long narrow panel beneath the parapet of the gallery. Here he attempts to show the interdependence of human life and the earth—which, you'll grant, is a pretty large order.

The Art Institute is open from 1 to 5 p. m. Tuesdays, Wednesdays, Thursdays, and Fridays and from 7 to 10 p. m. Thursday and Friday evenings; 9 a. m. to 5 p. m. Saturdays; 2 to 6 p. m., Sundays.

### The Library—and BNP

Facing the Institute, and—at first glance—closely resembling it, is the public library. Detroit's first public library was opened in 1865. The present building was begun in 1915. The War interfered and not until 1921 was work finally completed. White Vermont marble was used for the exterior, and Tennessee marble for the interior.

CASS GILBERT, designer of the Woolworth building, the New York Customs House, and many other buildings of note, designed Detroit's Main Library. Architecture is early Italian Renaissance.

Ascending the main stairway of this library, from the ground floor to the second, one looks up to find himself surrounded by a series of murals executed by the American painter, EDWIN BLASHFIELD. Don't be content to stand at the head of the stairway and gaze upon these paintings, but explore further.

Just inside the Delivery Hall will be found three other murals done by GARI MELCHERS. Mr. Melchers' murals are historical in subject, accurate and authentic in detail, gorgeous in coloring. Many of his paintings hang in the Art Institute across the street.

The Burton Historical Collection, on the third floor of the library, is one of the most notable and comprehensive of Americana collections.

Branches of the main library are found throughout the city, with the noted Medical Branch located in downtown Detroit at Library and Gratiot Ave.

It is convenient to make the Fisher, New Center, and General Motors buildings (they're all in the same family), the next stopping place, because buses or street cars going there may be boarded just on leaving the Art Institute. If the Public Library was the last stop, make your exit from the Cass side, then take a Dexter-Cass bus and get off right in front of the Fisher building.

Before stepping into the bus, however, walk across Cass to 5229, where you will be cordially welcomed at the new home of the Business News Publishing Co. Ask for George.

### General Motors Group

Street cars pass within one block of the General Motors building (Grand Blvd. is your stop). Red buses marked "Grand Blvd" will take you right to the building.

The Fisher building is considered one of the most beautiful in America, and was awarded a national prize as the finest example of architecture the year it was built. Its illuminated tower—all fiery and burnished gold and sun-glow—may be seen from all parts of the city.

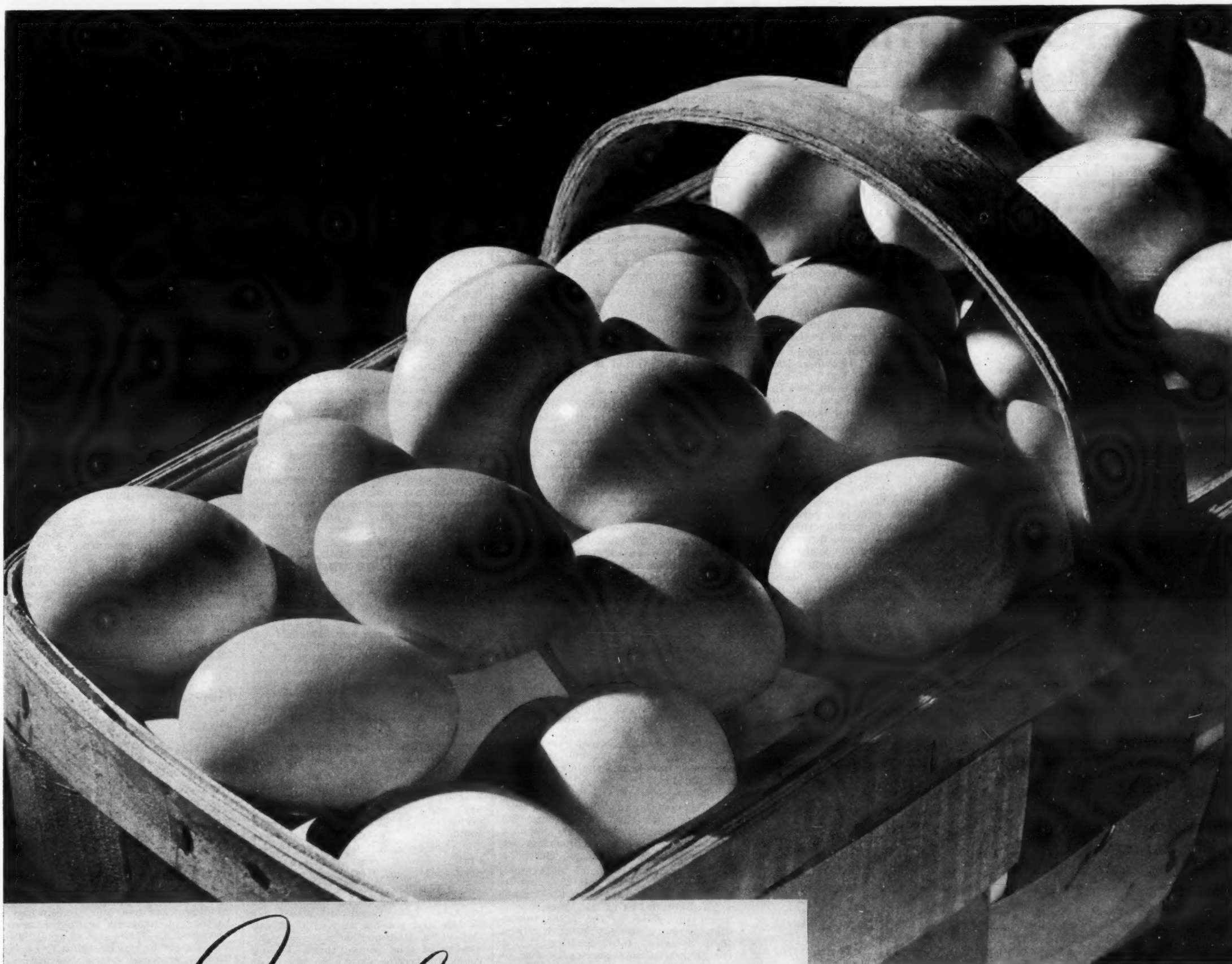
At night this "golden tower" offers what must be one of the world's most splendid sights. Egypt may have had its pyramids, and Greece its flawlessly symmetrical architecture and sculpture, but they had nothing to match the rich vision of the Fisher Tower—for in those days they didn't have artificial light. Even a newly risen October moon seems insignificant when the illuminated Fisher Tower is in the same range of vision.

On the first floor is the elaborately decorated Fisher theater, some of the smartest shops in Detroit, the L'Aiglon Fountain Room, and a first-class drug store.

L'Aiglon also has a tea room on the mezzanine and a dining room on the second floor. This is one of the best places in the city for clean, fresh food attractively served. They will be the caterers for the Refrigeration Fiesta tonight.

While strolling about, admiring with (Concluded on Page 8, Column 1)





*In this case*

**Kelvinator is the exception!**

**T**HERE is an exception to every rule and experience has proved to many a dealer that in the case of "putting all your eggs in one basket" Kelvinator is the exception. The dealer who standardizes on Kelvinator will find himself better equipped for profitable operation than if he tries to merchandise half a dozen lines. All the way through, his business is simplified—one resource, one service organization, one kind of sales training. This concentration not only reduces costs, but makes for hard-hitting, aggressive tactics on the part of salesmen who do not have to spread their energies in handling competitive products.

Kelvinator, in its complete line of more than 19 models, offers a size and a price to meet every requirement. Features that the public have approved have been incorporated generously in Kelvinator's models. The highest quality for the price is built into every model, and a value offered which will pile up good will.

Kelvinator does not leave the dealer to work out his own destiny, once the product is in his hands,

but furnishes complete sales promotion plans covering every month of the year, building up activity around the product and the dealer's store.

Kelvinator is the oldest manufacturer of domestic electric refrigeration and in all the years of its growth has been steadily strengthening its dealer position by strengthening dealers. It is because of this complete cooperation with dealers that the Kelvinator franchise has assumed unusual value in the electric refrigeration merchandising picture today. Kelvinator is leaving no stone unturned to maintain the value of the Kelvinator franchise. Its future is assured with Kelvinator's strong position in commercial refrigeration, with a new electric range, with oil burning equipment and with air conditioning coming rapidly to the fore.

If you are interested in such a franchise, write for complete details. . . . **KELVINATOR CORPORATION, 14250 Plymouth Road, Detroit, Michigan. Factories also in London, Ontario, and London, England.**



**K E L V I N A T O R**

(1150)



## PERSONALITIES

By George F. Taubeneck

(Concluded from Page 6, Column 5)  
mouth agape the finery of the walls and ceiling of the main floor, it is worth your time to take the elevator to the 28th floor and take a look-in at Station WJR, one of Detroit's leading radio stations.

There is a constant flow of visitors to this broadcasting mecca, and while all Detroit stations do not welcome the public, WJR's reception room is always open.

General Motors building is just across the boulevard from the Fisher building, and may be conveniently reached by the Concourse which connects the two structures.

General Motors building was, at the time of its construction, the largest office building in the world. It always contains a number of attractive automobile displays in the hall-like lobbies as well as in the salons.

The New Center building, put up by the Fishers at the nadir of the depression, may also be reached by subway from the Fisher building.

Palmer Park, one of Detroit's loveliest vistas, is about 5 miles north of the General Motors building, and may be reached by Woodward street car or a red bus.

Laid out as a park in 1870 and presented to the city in 1893 by Senator Thomas W. Palmer, whose family had owned the land since 1827, Palmer Park includes two lakes, several islands, winding drives amidst wooded beauty, and a picturesque log cabin with a chimney at either end and century-old furnishings.

### Other Buildings

"The greatest monument ever built to the ideal of the brotherhood of man" is the official description of Masonic Temple. And, in truth, it is an impressive and colossal structure.

If you get through it without getting lost and having to inquire your way out again, you should be able to qualify as a Radio City guide. Within its huge walls there is one of the mightiest auditoriums in the nation. So vast is its extent, and so high its ceiling that one feels almost as if one were in outdoors amphitheater when seated therein.

It is located at Temple and Second Blvd. and may be reached by bus marked "Second." However, it is only a few minutes' walk from any downtown hotel.

Detroit's most lofty skyscraper is the Penobscot building. It is easily seen for many miles in all directions because of the fire-red lighted ball placed on its top as a guide to air pilots. Incidentally, not even New York can show a more symmetrical setback skyscraper.

One of the first tall buildings in Detroit was the Majestic building, northwest corner of Michigan and Woodward Aves., across from the City

Hall. The top floor contains the offices of the U. S. Weather Bureau. In the basement is the French Village Restaurant, which isn't bad, if you "go for" gobs of heavy atmosphere and disguised food.

### Father Coughlin

Father CHARLES COUGHLIN's famed Shrine of the Little Flower is right on your route if you continue out Woodward. You will see it on your right in plenty of time to tell the driver that you want to be put off there—you and at least a hundred others.

The church is in Royal Oak, which is something of a town of its own, but is also a continuation of Detroit.

Still farther out, but certainly worth seeing, is the section known as Bloomfield Hills. It is reached by continuing out Woodward to Lone Pine Road. A turn to the left and you come upon a lovely bit of England transplanted.

Traffic does not intrude here, and you may enjoy a walk in the quiet freshness of the countryside. You will come upon Christ Church, and a little farther on, Cranbrook School (an exclusive private academy for boys).

In between and on either hand, you will see homes done in several variations of English architecture with acres of lawn, trees, and flowers. You will long remember the scene.

Grosse Pointe on Lake St. Clair is considered Detroit's most beautiful residential section. Certainly it is the most expensive and the most impressive. But it is a long way from the northern section of Detroit through which we have just been taking you.

It may be reached by taking a bus marked "Grosse Pointe," which starts on its route at Grand Circus Park, near the Statler hotel.

### Near Detroit - -

First: Greenfield Village, which should be placed on the "must" list of all visitors. It is a faithful and painstaking reproduction of a Colonial village, with exact replicas of many prominent buildings of American history grouped about the "green."

Here you may see most that is significant in the growth of America brought together by HENRY FORD in his own highly original manner. The "Village" is in Dearborn, Oakwood Blvd. and Airport Drive. It may be reached by taking a Dearborn bus which leaves from the City Hall.

Dearborn Inn is a delightful place to dine. It is near Greenfield Village, and seems more like a country estate than a hotel. There is music at dinner, and concerts on Sundays.

Furnishings, decorations, and food in the Early American Dining Room are all highly pleasing. There is also the English Coffee Shop. The Inn is about 30 minutes from downtown Detroit by automobile or bus.

Belle Isle is the chief recreation ground for Detroit in the summer. The value of this island is now estimated at more than \$20,000,000. It was bought from the Indians in 1780 for eight barrels of rum, six pounds of paints, three rolls of tobacco, and a small amount of wampum.

Later it became so infested with rattlesnakes that a herd of hogs was turned in to exterminate them, and then the name "Hog Island" became attached to the place.

The name was changed to Belle Isle on July 4, 1845, in honor of Miss Isabella Cass. In 1879 it was purchased by the city for \$200,000.

If you can overlook the picnickers and neckers, it's a charming and lovely spot—with the American mainland on one side, Canada on the other, deep-honking boats on one hand, pleasure craft on the other, and beauty everywhere.

The island consists of 707 acres, 2½ miles long, 5½ miles of shore drive, 15½ miles of driveway. Points of interest, aside from its beautiful natural setting, include the Detroit Boat Club, oldest boat club in America (organized in 1839) and the Detroit Yacht Club on the east side of the island.

There is an aquarium with 44 wall tanks which contain many varieties of fresh and salt water fish. The greenhouses are filled with flowers and plants from all over the world. Fifteen acres of the island are included in the zoological gardens, where there are bears, buffaloes, deer, elk, ostriches, and a great many other species of birds and animals.

Numerous lagoons dot the island, and canoes for lazily transversing them may be rented. There are facilities for almost any form of recreation. Belle Isle Bridge connects the island with the mainland. Buses run over the bridge every few minutes, or there are ferry boats that run on frequent schedule. Take East Jefferson bus or street car to the bridge and then the island bus, or ferry.

### Canada Is Near

Most visitors to Detroit want to cross the border to see what Canada is like. There are enough ways of getting there to please everybody. First, there's the tunnel—the only vehicular tube in the world connecting two nations.

Bus companies advertise "six minutes to Canada," and it is certainly no more than that through the tube. Since the tunnel is such a remarkable piece of engineering, we mention briefly how it "got there."

It is made of tubes of plate steel, ¾-inch thick. Interior is 23½ feet in diameter. Steel tubes for the tunnel were built in St. Clair, and towed down the river to the point immediately above their present location, then lowered into position in a trench which was previously dug to receive them.

After the sections were lowered into position, the entire bottom of the trench underlying the tube was filled with concrete, forming a solid foundation. Sheathing around the tube was then filled with concrete, forming a solid wall of stone three to four and one-half feet in thickness.

The Windsor Ferry leaves from the foot of Woodward Ave. every few minutes. Boats are comfortable, and get there with reasonable speed. Take Woodward bus or car going south to the river.

If you are driving your own car, there is the majestic Ambassador Bridge, which is open 24 hours daily to automobile and pedestrian traffic. The American approach is Porter at 21st St. Or, you may drive through the tunnel. American entrance to the tunnel is at Woodbridge and Bates Sts.

### Theaters

Cass theater is Detroit's leading house for "legitimate" stage performances. It is located at 300 Lafayette, corner of Wayne, within walking distance of all downtown hotels. From the Statler walk south on Washington Blvd. to Michigan, cross Michigan and walk down Wayne for one block. About five blocks from the Statler and less than two from the Book-Cadillac.

Michigan theater, Bagley near Clifford. About one block west of the Statler. This is one of Detroit's two best picture houses. First run pictures and big-time vaudeville. Edward Werner's orchestra.

Fox theater, Woodward Ave. at Columbia. Take a taxi or walk. Only about four blocks from the Statler, and walking distance from any downtown hotel. Cross Grand Circus Park and walk two blocks north on Woodward. This and the Michigan are the only two houses with first-run pictures and vaudeville. The Fox generally gets more "big names" than the Michigan, and frequently has a better show.

United Artists' is just opposite the Statler, on Bagley Ave. First run pictures of the better kind, but no stage show.

Capitol, recently re-opened with stage shows added. Easy walking dis-

tance from any downtown hotel. Located on Broadway, just off Grand Circus Park. This is one of the country's most beautiful theaters, and one of the four largest in the world.

The Adams, just across Grand Circus Park from the Statler hotel, facing Adams Ave. One of the city's oldest theaters. Recently remodeled and redecorated. Double feature policy.

State, Woodward Ave. at Elizabeth. Only one block from the Fox theater. Moderate admission prices and double feature policy. Close in to all hotels.

Madison, Witherell between Woodward and Broadway, facing Grand Circus Park. About one block from the Statler. A good place to see good features that you missed at first-run houses. Shows are the best in features, but not of recent release. Double feature policy. Low admission.

The "Dimers." These are a Detroit institution, duplicated nowhere else in the country. For 10 cents or 15 cents you can stay all night—and when we say "all" night we mean all night. Double feature plus a large quota of "shorts." If you go on a night when they change the program at midnight, you can see four features. The Colonial has amateur stage shows, which have attracted those "in the know" for years.

These open-all-nighters are strung up and down Woodward from Grand Blvd. to the Campus Martius. The trick is to drive up and down the avenue until you find a combination of features you haven't seen but are sorry you missed, and then go in with a carton of cigarettes and a sack of peanuts. Anything goes.

### Where to Dine and Dance

Hotel Statler has a formal dining room with music for dancing. Also Cafe Rouge and the Cocktail Lounge.

The Book-Cadillac. Washington Blvd. and Michigan Ave. Music, food, and dancing in the modernistic Mayfair room. No floor show, with the exception of occasional dance teams. A favorite spot with Detroit society. Also the really beautiful Venetian room, the English Grill and bar, and the Cocktail Lounge.

Detroit-Leland, Bagley at Cass. Main dining room with orchestra; coffee shop, which remains open all night.

Hotel Tuller, directly opposite the Statler, Park Ave. at Adams. Oyster bar and cafeteria. Table service, orchestra, and dancing in the Arabian room.

Fort Shelby, Lafayette Blvd. at First. Dining room. Coffee shop open to 1 a. m. Really good food.

The Wardell, Woodward and Kirby. In the Art Center, opposite Institute of Arts. Take Woodward street car or bus and get off at Kirby. Worth the extra distance because of the quality of food served there. Dining room and coffee shop. No music or dancing—unusually nice and peaceful surroundings.

Webster Hall, Cass Ave. at Putnam, has a spacious Cocktail Grill, good orchestra, food, and liquors, and usually the best floor shows in town. Dexter-Cass bus to Putnam.

Tea Garden Cafe, 1516 Woodward. Chinese restaurant with music and dancing. In the center of the downtown district. About one block from Statler hotel.

Eastern Star Cafe, Grand River at Grand Blvd. Ditto above, with addition of floor show.

### Industrial Plants

Ford Motor Co., River Rouge Plant, may be reached by taking Michigan Ave. car marked "through." It goes direct to the Administration building. Visitors are welcome at the Rouge plant. It is not open Saturdays and Sundays.

Chrysler, De Soto, and Hudson plants are all out East Jefferson Ave. Easily reached from downtown. Take East Jefferson street car at corner of Woodward and Gratiot, or Jefferson bus at Grand Circus Park. Chrysler and Packard also have display rooms on Jefferson.

The Dodge plant, 7900 Jos. Campau, may be reached by taking a Baker car direct, leaving from City Hall, or a Woodward car to Grand Blvd. and

then East Grand Blvd. bus to the factory.

Plymouth's plant is at Mt. Elliott and Lynch Road. Take a Gratiot car from downtown, transfer to Mt. Elliott, going north. Visitors are welcome from 9 a. m. to 4 p. m.

Of course Detroit is best known for its output of automobiles, but there are other industries located here whose products reach the corners of the globe, even as do the automobiles. For instance, there is Vernor's Ginger Ale, which has been made since 1867, and which doesn't taste like ginger ale. It is extremely popular in Detroit and environs, but scarcely known elsewhere. The main plant is on Woodward Ave., down near the river and may be reached by Woodward street car going south, or red bus.

Burroughs Adding machines are used in practically every office in the land. The sprawling red brick building on Second Blvd., about half-way between downtown Detroit and the Fisher building, is that of the Burroughs company. Reached by Second bus.

Detroit has several stove factories, among them that of the Michigan Stove Co., largest in the world. Located on East Jefferson Ave. It is quickly reached from downtown by boarding Jefferson car at corner of Woodward and Gratiot.

Parke-Davis is the biggest manufacturer of pharmaceutical supplies, and the greatest exporter of the same, in the world. This company has branch houses in practically every foreign city of note.

The firm of Frederick Stearns helps to make Detroit the leading pharmaceutical manufacturing center of the world. Frederick Stearns was a pioneer in this field in America. In 1856, in Detroit, he enlarged his small perfumery into a manufacturing chemist's shop. How it grew after that! The factory is out E. Jefferson, and the sign may be seen long before the plant is reached. Jefferson street cars and buses go directly past the factory.

### Newspapers

The Detroit Free Press is Michigan's oldest newspaper. Visitors are taken through the building daily, except Sunday, at 3 p. m. Located at Lafayette and Cass. Walking distance from downtown hotels.

Detroit News building, Lafayette and Second Blvd., home of The Detroit News and Station WWJ. This is one of the oldest radio stations in the country, and was the first to broadcast regular radio entertainment. Visitors are welcome from 1 to 3 p. m. daily except Sunday.

Detroit Times, the local Hearst publication, is published in the Times building, Cass Ave. and Times Square.

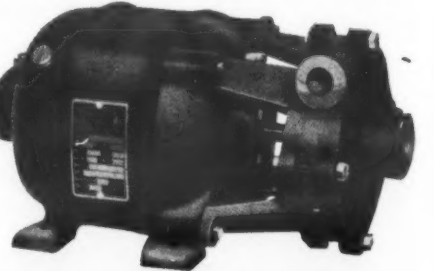
Other publications include ELECTRIC REFRIGERATION NEWS (of course), The American Boy, Detroit Saturday Night, numerous foreign newspapers, church publications, and trade papers.

### Some Other Facts

In population Detroit is the fourth largest city in the United States. This city contains the largest steel casting plant in the central west. It has the largest factory in the world making electric portable vacuum cleaners. Here is located the world's largest adding machine factory.

## GREETINGS!

While in Detroit why not see PALMER ELECTRIC COMPANY, 1258 Park Place—Centrifugal pumps for all refrigeration service.

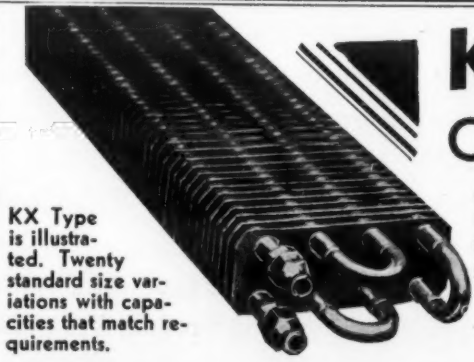


The most copied pump today

## KRAMER CASE COILS

are ALL COPPER, hot tinned, and are made to any specified fin spacing and in special widths.

Write for REFRIGERATION PRODUCTS CATALOG



KX Type is illustrated. Twenty standard size variations with capacities that match requirements.

TRENTON AUTO RADIATOR WORKS  
210 West 65th, N.Y.C. TRENTON, N.J. 5114 Liberty Ave., Pittsburgh, Pa.

## Ask the Service Man's opinion of ANSUL REFRIGERANTS

The service man is a good judge of quality in a refrigerant. That is why service men choose Ansul Refrigerants. They know they can rely upon them to provide complete refrigeration satisfaction.

### SULPHUR DIOXIDE

Pure, bone dry and free from all foreign materials. Contents of every cylinder analyzed before shipment. Available at conveniently located warehouses. Cylinders from 2 to 150 lbs., ton drums and tank cars.

### METHYL CHLORIDE

Fast freezing, stable and non-corrosive. Contents of every cylinder analyzed before shipment to assure low moisture and acid content. Available in any quantity, spot or contract shipments. Cylinders from 3 to 130 pounds.

Warehouse stocks conveniently located.

ANSUL CHEMICAL CO.  
MARINETTE - WISCONSIN





## Westinghouse Trains Home Economists in 'Home of Tomorrow'

MANSFIELD—Post graduate work in the practical application of home economics is being given at the Westinghouse "Home of Tomorrow" Institute here for home economists or home service workers employed by electric power companies or appliance dealers.

The curriculum has three divisions—electric cookery and related subjects, refrigeration and food service, laundry and home cleaning. Each division of the training is supervised by the Westinghouse home economist specializing in that particular branch of the work.

Instructors at the Institute are: Pearl Gray, Edna I. Sparkman, Grace Diebig, and Elba Schmidt.

Training includes sales work on the appliances used in the various divisions of the course, which divisions are correlated to make the training complete. Each student may select the subjects she considers most valuable to her and her company and concentrate on those.

The girls live at the "Home of Tomorrow" while attending the Institute as the guests of Westinghouse Electric & Mfg. Co. They cook their own meals, serve them, and live much as they would in their own homes. Some classes remain two weeks, others stay for a week. The training is adjusted to the time the students can stay.

Standard equipment is used for training instead of the specially designed equipment originally developed and installed in the "Home of Tomorrow."

## 'It Pays for Itself' Is Theme of Campaign

MONTEREY, Calif.—"It pays for itself" is the theme of the second annual electric refrigerator campaign which the Electric Appliance Society of Northern California is conducting.

"Quantity marketing, elimination of food spoilage, utilization of leftovers and other economies made possible by this wonderful electrical servant will save many dollars each month," declares a portion of an advertisement run by distributors of the following 14 makes of electric refrigerators:

Apex, Atwater-Kent, Crosley, Cyclops, Frigidaire, General Electric, Gibson, Grunow, Hotpoint, Kelvinator, Leonard, Norge, Stewart-Warner, and Westinghouse.

In addition to emphasizing the saving effected in the family budget by the electric refrigerator the advertisement lists other points as follows: "It safeguards the family's health. It keeps food fresh, wholesome, and appetizing. It makes possible the preparation of delicious frozen desserts or chilled salads more economically. It provides an abundance of ice cubes."

## Dealer Shows Prospects Broadcasting Technique

OCONOMOWOC, Wis.—G. C. Zindars, proprietor of Zindars Radio Sales & Service here, has capitalized on the amateur radio broadcasting station which he operates to increase his sale of receiving sets in this area.

Taking advantage of the wide public interest in the technique of broadcasting, Mr. Zindars holds public broadcasts several times monthly, which he invites 50 to 100 of his best prospects to attend, and watch a program go "on the air." The various steps in broadcasting are also explained to the audience.

Both actual and potential customers attend these broadcast meetings, and Mr. Zindars has found this method quite effective in increasing his radio sales, as well as in acquainting the public with his store and service.

People invited to a Zindars' broadcast usually develop into good word-of-mouth publicity agents for the store. Careful selection and shifting of invitations enables Mr. Zindars to cover his entire prospect list in a relatively short time, and actually brings most of his good prospects right into his store.

## 35 Stations Broadcast Grunow Transcriptions

CHICAGO—Radio broadcasts, sponsored by General Household Utilities Co. through the World Broadcasting System, are now being heard over approximately 35 of the World chain stations. Grunow distributors are placing the transcriptions on stations of their own choice.

The program consists of music by Marvin Saxby's orchestra from Palmer House, Chicago, interspersed with vocal arrangements by Russell Morrison and Muriel LaFrance. The transcriptions run 15 minutes each, and the weekly frequency varies on individual stations, depending on local problems and the wishes of Grunow dealers and distributors in each city.

# Damp Insulation like Damp Clothing No longer gives protection

CLOTHING keeps us warm by stopping the heat of our bodies from dissipating into the air. If we get wet, we are immediately chilled, for the clothing no longer functions as insulation and the body heat quickly passes right through into the air.

This is what happens to most materials used for insulation in refrigerators after some time in use. Regardless of any so-called "moisture seals," moisture penetrates to the insulation when a refrigerator is in use. Because of the difference in temperature between the warm outer shell and the cold inner wall, there is always a movement inward of "water vapor," which will penetrate even a sheet of steel.

If the insulation is "non-hygroscopic," that is, if it resists moisture like a duck's back, it will be unaffected. Otherwise it will absorb the moisture and become damp. And damp material, of whatever nature, will not insulate. It will ruin the efficiency of your refrigerator in a short time by placing too much burden on the unit. It will result in high current cost, poor refrigeration and eventual breakdown.

Scientific research discovered in the Dry-Zero fiber a commercially practical "non-hygroscopic" material. To be sure your customers will never have any cause for dissatisfaction from insulation failure, insist on Dry-Zero Insulation in the boxes you sell. If you are now selling Dry-Zero insulated refrigerators, be sure to tell your prospects why this better and more expensive insulation will save them from 30 cents a month when new to as much as \$1.50 in cost of electricity. Dry-Zero Insulation will give them efficient heat-stopping protection for the entire life of the refrigerator.

Dry-Zero Corporation, Merchandise Mart, Chicago, Ill. Canadian office, 687 Broadview Ave., Toronto, Ontario.

**DRY-ZERO**  
REG. U.S. PAT. OFF.  
THE MOST EFFICIENT  
COMMERCIAL INSULANT KNOWN





## AIR CONDITIONING

### Coast Guard's New Boat Air Conditioned

WASHINGTON, D. C. — For the safety as well as the comfort of the crew air conditioning has been installed on the recently launched Coast Guard motor lifeboat *Invincible*.

This new coast guard boat is subdivided into numerous watertight compartments to obtain a condition of unsinkability in the event that the boat should be damaged by collision or otherwise. The "safety" feature consists of a system for introducing fresh air by means of blower suction to the various compartments of the ship, to be used when the entire vessel is battened down or closed up.

The air-conditioning system in general provides for a hot water boiler with a circulation hooked to and with a return from the enclosed heater section. A motor-driven blower passes air over the heater section and this heated air is directed to the various compartments of the ship through a duct system, with a similar duct system on the other side of the ship for the cooled return air.

By means of a special intake apparatus, fitted with a float, it is possible to introduce fresh air from the outside into the system and supply the needs of the refugees who are crowded below in the cabins.

Boiler and heater section are of American Radiator Co. manufacture. An induced draft system for the boilers is provided, hooked up to a control for maintaining a constant temperature of the hot water supply.

### 'Ideal' Home Equipped With G-E Furnace & Air Circulator

SHORT HILLS, N. J.—W. W. Drewry, builder of South Orange, N. J., recently placed an order for six General Electric air circulators and six G-E oil-burning furnaces with the Northern Air Conditioning Corp. of Newark.

The air circulator employs fans installed in the attic to circulate air throughout the house and remove the blanket of attic air which overheats the bedrooms below.

First of the six installations was made in "America's Ideal Suburban Home," sponsored by the Better Homes in America Committee for the Oranges, Maplewood, Millburn, and Short Hills, representing women's and civic clubs of those communities. The "ideal" home was opened as the committee's demonstration home recently in connection with the nationwide observance of "Better Homes Week."

### Century Describes New Line of Motors

ST. LOUIS—New literature depicting a new line of motors designed to meet the requirements of air-conditioning installations, refrigeration systems, blowers, fans, pumps, etc., has just been brought out by Century Electric Co. here.

### G-E Unit Replaces Washed Air System For Hotel Grills

ST. PAUL—One of the most interesting applications of air conditioning ever undertaken here is now under way in Hotel Lowry, one of St. Paul's smartest hostleries, where a General Electric system of 41 hp. is being installed to provide year-round comfort in the hotel's Cocktail Lounge, Terrace Cafe, and Terrace Grill.

The G-E installation is replacing a system of washed air ventilation which has been in use in the hotel for a number of years. This system, now considered overloaded, is being segregated to take care of the hotel's coffee shop and several small rooms.

Engineers for Sutherland Air Conditioning Corp., which is making the installation, were faced with a number of rather interesting problems in the hotel job, and have finally worked out a combination of well water cooling, followed by additional cooling and dehumidification by mechanical refrigeration, which is expected to reduce operating costs considerably.

The system is zoned so as to provide independent cooling for two subdivisions. In each zone, initial cooling is effected by low temperature water passing through counter-flow coils.

Under conditions of additional temperature and humidity where this water cooling is sufficient, the rest of the equipment is idle, but whenever either zone requires additional cooling or additional dehumidification, these are automatically supplied by a two-speed General Electric CM-10L, 15/7½-hp. condensing unit.

Management of the hotel plans to air condition additional space in the near future, and ultimately expects to provide year-round conditioning in all of its public space, as well as many private suites.

### Air-Conditioned Shoe Store



Feltman & Curme shoe store, Chicago, where a 5-ton air-conditioning system has just been installed. Note how the duct work is concealed over the shoe cases.

### Shoe Store Installs 5-Ton York System

CHICAGO—A five-ton air-conditioning system has just been installed in the Feltman & Curme shoe store on State St., here by Westerlin & Campbell Co., midwestern representatives of the York Ice Machinery Corp.

Novel feature of the installation is the ingenious method of building all air ducts into each side of the room at the ceiling just over the tall shoe cases, so that the system is entirely invisible except for the outlet and diffuser grilles. Even the fan is installed behind the case, in a rear corner of the room.

The cooling unit consists of a York model C-600 air-conditioning coil, while the refrigerating compressor is a 5 hp. York Freon machine installed in the basement. Due to the fact that the store is located in Chicago's "Loop" shopping district, the equipment is operated with direct current.

Total air supplied is 2500 c.f.m. with provision for introduction of fresh air from the outside at all times. The control system is arranged so that the building engineer can operate the system part of the time on Sundays and holidays in order to insure comfortable conditions when the store opens in the morning.

This store is one of a chain of 75, extending from coast to coast.

Roland Feltman, one of the owners, has this to say about air conditioning: "I have been watching the progress of air conditioning in retail stores for some time, and as a result decided to equip our store at 134 North State St. when it was being modernized. I believe the system there will demonstrate its value this year."

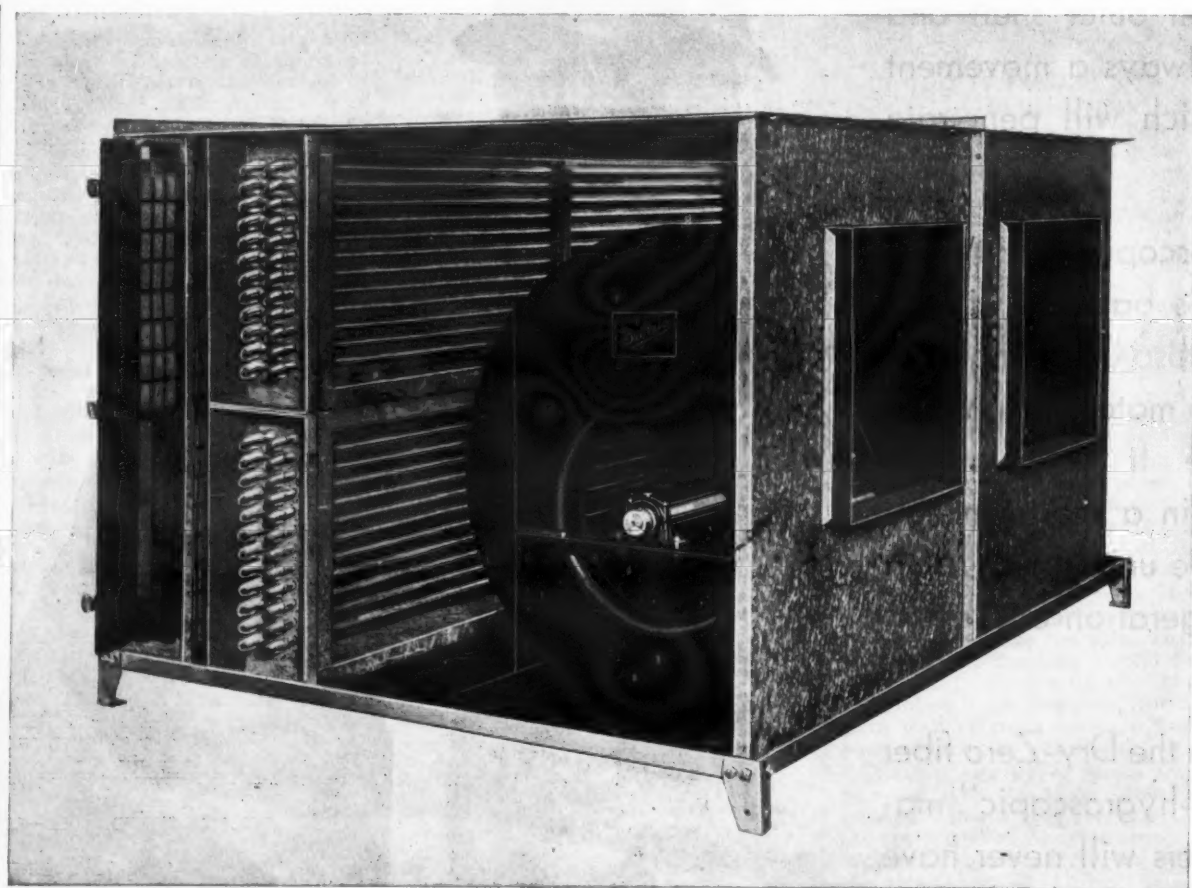
"Our store at Phoenix, Arizona, is being similarly equipped. It is an interesting fact that out there, indoor temperatures of 100° F. are not uncommon. Although Chicago does not have these high temperatures, air conditioning here is just as necessary for comfort in business."

### McQuay Manual Gives Engineering Data

MINNEAPOLIS, Minn.—Recently issued by McQuay, Inc., is a manual covering its line of coils for cooling, heating, air conditioning, and process drying, and which gives complete engineering data for estimation of jobs in the field.

Tables and charts in this manual include the following:

Blast coil performance data, conversion table for determining capacity and final air temperature at various gauge pressures, mean effective temperature difference table, "K" factor table, cooling capacity tables, air friction chart, water flow friction chart, water velocity chart, and psychrometric chart.



"PC" Cabinet with Side Removed, Showing Fans, Cooling Coils and Filters. Heating Coils and Humidifiers can also be furnished.

## Condition for COMFORT with practical, flexible "PC" Units

### Other Buffalo Equipment

Internationally - known and used for more than fifty years, Buffalo fans are built for every type of air or gas handling.

We also manufacture complete lines of Unit Coolers, Unit Heaters, Air Washers and Cooling Towers.

Data sections covering all these items will be sent on request. Mention items in which you are interested.

Have you been looking for a simple, practical, flexible method of air conditioning for year 'round comfort? If so, here's the answer.

The "PC" Cabinet was designed for the job, by engineers long familiar with the requirements of air conditioning service. It's arranged so that you can have simple cleaning and cooling for hot weather, or cooling and heating or complete air conditioning for all year service.

The "PC" Cabinet can be installed outside the room or rooms to be conditioned. Efficient, quiet multiblade fans will handle external resistance of distributing ducts.

Many of the popular sizes and combinations are stocked for immediate shipment. New Data Bulletin 2967 gives full particulars, with information on how to figure required units. Write for your copy.

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"PC" Central Conditioning Cabinets for "Comfort" Air Conditioning

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The Type-WRBP is a super sensitive regulator with the advantage of delivering maximum capacity at a minimum pressure rise of 15 pounds. High or low water pressure will not effect the operation of this valve and owing to the special construction, a minimum of restriction is obtained.

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REGULATORS—SAFETY DEVICES FOR  
REFRIGERATION AND AIR CONDITIONING.





## Modine Builds Unit Coolers in Two Types

RACINE, Wis.—The 1935 Modine unit coolers for space cooling are now available in two types and seven sizes, reports A. G. Dixon, sales manager, heating division, Modine Mfg. Co. here.

With the new cold water type unit cooler, cold water cooling may be combined with steam heating applications, as well as with hot water heating, Mr. Dixon said.

Modine cold water type unit coolers are fitted with moisture eliminator assembly for the collection of moisture from the atmosphere. Deep well or tap water, non-corrosive brine, or water chilled by ice or mechanical means may be used as a cooling medium. The moisture eliminator assembly may be removed in the fall.

The direct expansion type unit coolers have a specially constructed core and are used in conjunction with a compressor, employing direct expansion refrigerants, such as methyl chloride, Freon, or ammonia, for the cooling medium.

## Year-round Conditioner Sold to Court House

ALAMEDA, Calif.—Air-conditioning equipment for control of temperature and humidity during winter and summer is being installed in the Alameda Court House here by Edward B. Ward & Co., Westinghouse air-conditioning dealer.

Equipment will be so arranged that the heating, cooling, and humidity may be controlled independently in each of the 13 court rooms.

Each court room of the new \$1,500,000 court house will be provided with a thermostat for the operation of the system. Three Westinghouse condensing units will be controlled automatically by the temperature of the water circulated to the various air conditioners with one, two, or three of them in operation, depending on the load conditions.

The cooled water will be pumped to the 13 rooms with special types of air conditioners equipped with cooling coils, heating coils, special damper control, and filter fans.

A switchboard with all of the control equipment, circuit breakers, time delay relays, and interlocks, arranged in a dead front, all steel construction panel will be provided to control the condensing units, condensing water pump, and cooling tower pumps.

## Kroeschell Book Shows Systems in Chicago

CHICAGO—Portraying with photographs and accompanying explanatory captions some of its many and varied air-conditioning installations, a new brochure, beautifully designed, is now being distributed by Kroeschell Engineering Co., local distributor of air-conditioning equipment.

Among the many installations illustrated is that of the complete year-round system placed in the Tribune Tower. A number of photographs of this installation are used, including one of the unit in famed Cartoonist John T. McCutcheon's studio.

Also interesting are the photographs of installations in private residences. In one of these the refrigerating unit is shown located underneath the sink in the butler's pantry.

Other examples of air-conditioning systems which Kroeschell Engineering Co. has placed as shown in the brochure include a number of private offices, general offices, theaters, restaurants, and a bank.

## Women's Wear Store Buys Auditorium System

HARRISBURG, Pa.—The Mary Sachs Shop, women's wear store here, recently installed a complete Auditorium air-conditioning system.

Equipment was furnished by the Carrier Engineering Corp., reports Herre Bros., licensed Auditorium agent for the installation. Architects were Lawrie & Green. Charles Leopold, Philadelphia, was engineer.

## Henry Describes Line of Dehydrators

CHICAGO—Just issued by the Henry Valve Co. of this city is a new bulletin describing the company's line of dehydrators and dehydrators for refrigeration systems.

The dehydrator is a combination of a dehydrator and liquid flow indicator, built into a single compact unit. A liquid sight port indicates a shortage of refrigerant by the presence of small bubbles of gas which pass into the liquid sight glass.

A feature of the dehydrator is the dispersion tube, connected to the inlet port, which exposes the entire volume of dehydrant to penetration by the refrigerant and reduces pressure drop.



**GILFILLAN REFRIGERATORS  
IN THIS AREA—ALL IN  
CABINETS BY**

**Seeger**

SAINT PAUL

The foreground of the Aeroplane View above—of a new Development in Los Angeles—shows over two square miles of recent building activities.

Considerably more than half of the buildings—over 500—have Cabinets by Seeger with Gilfillan equipment.

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SAINT PAUL, MINNESOTA

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BOSTON, MASS.  
SAN FRANCISCO, CALIF.  
LOS ANGELES, CALIF.



## AIR CONDITIONING

# Medical Research Indicates Colds Aren't Transmissible Under Controlled Air Conditions

THE following article is a complete report of a study of the transmissibility of the common cold under controlled environmental conditions, in which an air-conditioned room was used.

These studies are being conducted by William J. Kerr, M.D., and John B. Lagen, M.D., from the Division of Medicine, University of California Medical School, San Francisco.

This report is being published because it suggests that a common cold is not transmissible in an environment arranged for maximum comfort, which air conditioning is designed to effect.

Doctors Kerr and Lagen with the characteristic reticence of true scientists, point out that their tests were not conclusive because of the comparatively small number of subjects with which they worked, but their report indicates that they are impressed by the fact that not one of the subjects took cold.

Edwin C. Hill, widely known newspaperman and radio commentator, brought the results of these tests before the public in one of his articles for the Hearst newspapers under the heading, "The Men Who Couldn't Catch Cold."

In response to a request from ELECTRIC REFRIGERATION NEWS, Dr. Lagen described the air-conditioning equipment used in the test as follows:

"Our air-conditioned room is completely isolated by four inches of cork on all sides. Entrance is through

an antechamber, also air conditioned, with refrigerator doors at either end. The windows are of three panes of glass to prevent external temperature influences.

"The air, continuously recirculated, enters at the top at about 60 cu. ft. per minute and is removed at floor level. The air passes through a dehumidifying tank of water spray fed from a storage tank containing ammonia coils from an ammonia compressor. The desired temperature is maintained by having the air flow over steam coils.

"The system is, therefore, continuous recirculating of air with washing, dehumidification and heating.

"No humidifier is contained, although we have considered putting one in, in order to obtain high relative humidity at a given temperature.

"The apparatus once set and adjusted will maintain the required wet bulb and dry bulb temperature for any length of time. The extreme limits are about 15 per cent relative humidity at 100° F. and 85 per cent relative humidity at 40° F. with all the variations between.

"Installation was by the York Ice Machinery Corp., using Tycoos single-duty compressed air regulators. One of these regulates a damper which controls the amount of air flowing through the dehumidifier and bypasses the rest over heating coils. The second regulates the amount of cold brine flowing from the storage tank into the dehumidifier.

"There is also in the room a Brown four-point recording potentiometer, recording the wet bulb and dry bulb temperatures in the room and also the wet bulb and dry bulb temperatures of the atmosphere."

For the past two years at the University of California hospital we have been engaged in a study of the common cold. We have deliberately chosen this disease for several reasons. It is a condition prevalent in the population at large, of economic importance, and one which has recently been brought to the attention of the scientific and lay mind. Evidence of this is the increased activity in research work on its etiology and the great increase in advertising of supposed cures or aids in its treatment.

The common cold is usually considered an upper respiratory affliction with late secondary general respiratory tract involvement, and with the etiology possibly bacterial or, more probably, a virus. As such it would seem to fall within the scope of the nose and throat specialist and that of the bacteriologist.

We should like to present the hypothesis that the common cold appears to represent a failure of the body to adjust itself to a varying environment, and a study of this disease offers a means to a better understanding of the normal physiological responses of adaptation.

It is not, then, a localized condition but a general one, with a more or less marked local involvement. We have some knowledge of the functions of the skin, kidneys, and respiratory tract by means of which the temperature and water balance of the body are maintained within narrow limits.

Through the nose (discounting habitual mouth-breathers) must pass all the inspired air, at the prevailing temperature and humidity of the atmosphere, but before reaching the lung this inspired air must be raised to approximately body temperature and its relative humidity appreciably

increased, if it is low to begin with. This is done wholly or chiefly in the nose, by means of the great vascularity of the erectile tissue of the turbinates.

We believe this system to be integral with the skin, kidneys, and lungs in maintaining the water balance and the temperature of the body, besides its primary purpose just outlined. It is apparent in the disease in question that one or more, and probably all, of the components of this integral system are disturbed.

### Early Symptoms Bear Out Theory

This is borne out by the early general symptoms of a common cold, which are: a sense of chilliness and even actual chills; decrease in the amount of perspiration, to an actual absence, resulting in a dry skin; excretion of increased amounts of urine, of low specific gravity and very pale color. The local symptoms then begin, chiefly rhinitis with its incident sneezing, boggingness of tissue, and blockage of breathing.

During recovery, when the local symptoms abate, there comes a general feeling of return to normal temperature, the amount of perspiration increases and the excretion of urine becomes more normal in amount, specific gravity, and color.

The frequent recurrence of the common cold in susceptible individuals, its seasonal occurrence, and the absence of fever and leukocytosis in the early stage are points against an infectious origin.

The lack of immunity or resistance, likewise seen in many common diseases of the lower respiratory tract (pharyngitis, laryngitis, bronchitis and even pneumonia) suggests that perhaps all of them may have another factor besides infection which initiates them.

Since the time of Pasteur we have been seeking the "little things" in our environment, bacteria and other living things, as the cause of most of our diseases and have neglected to study adequately the environment or those functions of adjustment within the body itself, which, in addition to the immune reactions, may be classed under the general head of resistance.

### Trend Away from Bacterial Theory

A comparison of current texts with those of 30 years ago will indicate the trend away from the idea of the bacterial origin of many diseases and the proof that many formerly thought to be bacterial are due to other causes.

Recent studies carried on chiefly by bacteriologists and epidemiologists have assigned a secondary role to the bacteria, the ordinary inhabitants of the upper respiratory passages. Their pathogenesis in producing secondary complications cannot be doubted, particularly sinusitis, otitis media, tonsillitis, etc.

The recent work of Dochez and his associates strongly suggests that a filterable virus is the etiologic agent (for at least a variety of the common cold). We are not prepared to question this thesis, but suggest that if a filterable virus is the cause, the environmental factors and the general body responses to them must be considered in the preparation of the soil, and to a greater degree than heretofore.

### Cooling Power of Air as Cause of Colds

We proposed to test the hypothesis that the excessive cooling power of the air at certain time (cooling power being an expression of the dry bulb temperature and velocity of the air derived by Leonard Hill), acting upon the body when the periphery is open through excessive exertion, fatigue, or environmental factors themselves, all of which allow heat to dissipate readily through the skin, will in the susceptible individual produce a common cold, or a variety of rhinitis indistinguishable from a common cold.

The rhinitis frequently indistinguishable from the common cold, produced by allergens, chemical fumes, dusts, and physical contact with the nasal mucous membrane, is not at present under consideration and bears no direct relationship to the common cold itself. The effect of these agents is usually of much shorter duration and rarely results in secondary bacterial invasion, unless the exposure to them is chronic in nature. It may be that careful investigation of the effects of these agents will yield valuable information as to local changes in the nose, which seem comparable to those occurring in the common cold.

Before extensive studies were begun upon our problem, we decided to test the transmissibility of the common cold under controlled environmental conditions.

For this purpose an air-conditioned room at the University Hospital was used.

This room, which provides bed space for 4 to 6 patients, is completely isolated from the outside atmosphere, being provided with its own air completely filtered and maintained at any temperature and humidity desired.

It contains also an air lock, which permits ingress and egress with a minimum exchange of outside air, and a special lock, which permits service without any break in isolation of sub-

jects. The air lock, which receives the same air as is supplied to the room, contains the recording and controlling instruments and quarters for the experimental investigator, who was the only one allowed to enter or leave during the course of the experiment.

### 60° to 62° Wet Bulb Maintained

The room was maintained at a temperature of 70° to 71° F., dry bulb, and 60° to 62° F., wet bulb, which is a relative humidity of 55 per cent.

The air flow is approximately 66 cubic feet per minute, which gives a cooling power of six to seven or within the normal limits of Leonard Hill.

Barometric pressures were read daily and checked with those of the Weather Bureau. There is a very slight constantly positive pressure, due to air pumped into the room.

The experimental subjects were males, between the ages of 21 and 40 years, who by history had three or more colds per year, the average being five to six, and who had not had a cold within recent weeks.

They were placed in the room in groups of three to five and allowed to remain between five and eight days as an incubation period to determine their freedom from an early cold.

### Exposed to Colds by Contact

At the end of this period an individual suffering from a common cold, with onset 12 to 36 hours previously, was brought in and allowed to remain for 24 to 48 hours, the contact being such as exists in normal contacts in a home, namely, eating and playing cards together, use of a common drinking glass, being sneezed at, and the like.

The experimental subjects were then kept another four to six days in order to have them under observation during the development of any symptoms.

In one group of five the degree of exposure was carried to the point of contaminating the thermometers just before temperatures were taken. The material used for this purpose was the fresh nasal secretions which ran freely from the nose of an individual with a common cold in about the 24th hour, the secretions being allowed to dry on the thermometers. They were obtained from the same individual to whom the subjects were being exposed.

Nineteen subjects in five groups of three to five each were so exposed. No common colds or any symptoms referable to a cold were observed in any of the experimental subjects.

Our experiments on a group of presumably susceptible subjects, when kept in an environment arranged for maximum comfort, and exposed to sufferers from a common cold in the early stages, suggest that the common cold is not transmissible under these conditions.

### Even Inoculated with Cold Germs

Another experiment performed was the inoculation of experimental subjects with material obtained from individuals suffering from a fresh common cold in the first 24 hours. The method used was to collect the nasal secretion from the individual by letting it drip into a sterile container and then to divide it into two portions.

One portion was then used without further preparation, the second was centrifuged at medium speed for 10 minutes, just sufficient to clear it grossly, and the clear supernatant fluid was used.

Inoculation of the experimental subjects was carried out by putting two to three drops of the desired material into each conjunctival sac. Bacteriologically, this method is as effective as intranasal inoculation and any direct irritation of the nasal mucous membrane is avoided.

There were two groups in this series, the subjects in each group being exposed to a different donor and comprising five subjects in one group and four in the other. Of these nine subjects inoculated, four received the untreated nasal secretions, four received the centrifuged material, one received heated uncentrifuged material (control).

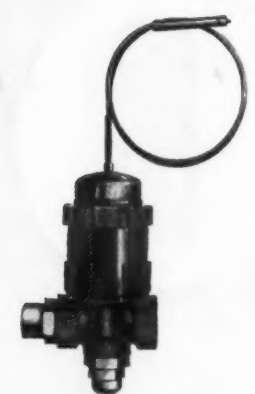
In no instance did any of these nine subjects develop any symptoms or signs of a common cold, and there were no signs of conjunctival irritation.

Five of these subjects had already been exposed to a patient with a cold, and, having developed no symptoms of a cold after an incubation period of five days, were then inoculated directly with the nasal secretions of another donor.

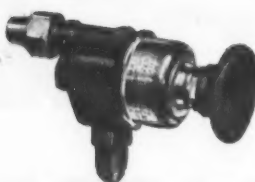
This series is too small to permit of any conclusions being drawn, though the completely negative results are of interest and are in direct contradiction to previously published work of other investigators.

We regret that the number of subjects we have been able to expose up to the present time is so small, and expect to increase it shortly in order to secure results of statistical value. Other studies upon the clinical course and response to treatment of the common cold are being conducted, and a survey of the incidence in a group of 1,300 subjects is being made.

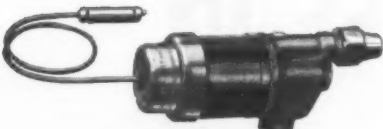
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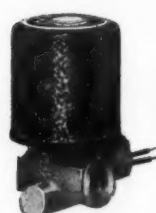
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Control Switch No. 250 Model RB3



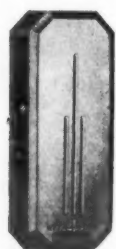
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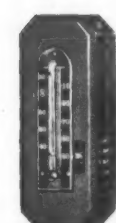
Solenoid Valve No. 683R



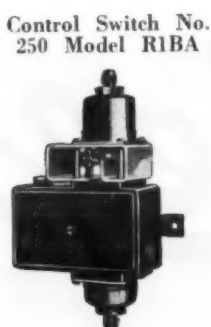
Electric Valve No. 640



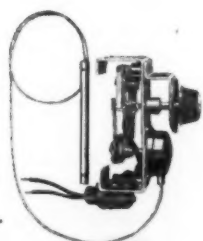
Humidistat No. 697



Room Thermostat No. 444



Control Switch No. 250 Model RIBA



Cabinet Thermostat No. 261

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## M-H Booklet About Air Conditioning Is Written for Public

MINNEAPOLIS—The functions of air conditioning, its advantages from a health and comfort standpoint, and its application in homes, business, and industry is the subject of a booklet, "This Thing Called Air Conditioning," just issued by the Minneapolis-Honeywell Regulator Co.

Written in laymen's language, the booklet presents a view of the whole air-conditioning field in perspective rather than a treatise for or against any one type of equipment, and is designed principally to show the part which automatic controls play in the operation of air-conditioning systems.

The six factors involved in satisfactory air conditioning—heating, cooling, humidification, dehumidification, distribution, and cleaning—are first explained, and the importance of proper control stressed in maintaining year-round comfort.

"The temperature, humidity, and motion of air, when taken together, produce the sensation of bodily warmth, and conversely influence the elimination of heat from the body," the booklet states.

### Comfort in Dry Air

"The human body because of evaporation from its surface, feels cooler in dry air of comparatively high temperature than it does in air of a considerably lower temperature which is so moist that evaporation of body moisture takes place slowly. It is also true that air at normally comfortable temperature feels cooler when it is in motion.

"It, therefore, follows that various combinations of temperature, humidity, and air movement will produce the same degree of comfort. All of the combinations which produce the same degree of comfort are said to have the same 'effective temperature.'

"From this explanation, it is apparent that effective temperature is not a temperature measurable by a thermometer, but is a complete index of the effect of temperature, humidity, and air motion upon the human body."

Experiments by the scientist Paul of the Institute of Hygiene, Breslau, were among the first made of the effect on the human body of changes in the combinations of the three factors. By placing his subject in an air-tight compartment, and varying the temperature, moisture content, and movement of air, he discovered the necessity of ventilation to comfort.

### Two General Methods

"There are two general methods for air conditioning," the booklet states. "First, with a central system; second, with unit air conditioners. Both have their advantages.

Discussing the installation of air-conditioning equipment in existing buildings:

There is an air-conditioning system available for every home or building. No means, however, exist of making a blanket estimate of the installation cost. This depends almost entirely upon the type and size of the building, and the degree to which conditioning is to be undertaken.

Conditioning, the booklet holds, need not of necessity be a costly venture. It can be accomplished step by step; that is, some of the factors can be incorporated in the heating system as it exists, and the remaining ones added from time to time as the need arises, or as finances permit.

Cost of operation, likewise, is governed by several factors, among them size and construction of the building, climate, and the degree of conditioning desired. While installation investment is made but once, operating cost continues as long as the system is used.

### Procedure Outlined

General methods of procedure, for both summer and winter conditioning, are outlined in the booklet.

For winter conditioning, the first step advised is (where a central system is to be installed) to make provision for the delivery of conditioned air throughout the building. This need not, it is pointed out, be as costly as it at first appears, nor need unsightly ducts be placed promiscuously throughout the structure.

The ducts may be used not only for the circulation of cleaned air, humidified in the winter, but also for dehumidified and cooled air in the summer. Heating may be continued from radiators already installed as part of the heating system.

If the unit system of air conditioning is to be applied, in which a system of radiators is already in use, it is advised that the radiators can be removed, and the unit conditioners installed in their places, and connected with the piping of the heating system. The cooling supply for such units may come either from a central cooling system or from individual cooling units built into the conditioners.

In a warm air heating system, ducts

for circulation of conditioned air are provided. The next step is to add controlled humidification; that is, provision for the supply of an adequate amount of moisture during the heating season. This can be accomplished through the use of water sprays, through which the air is forced. A fan is also required at this stage, to make certain of adequate circulation of the air.

Installed near the heating plant, such a fan draws air from the rooms which are being heated, circulates the air through the ducts and back to the rooms again after being cleaned and humidified. It is then not difficult to add a means of cleaning, the booklet states; the addition of sprays for humidification can also be used for cleaning the air, or dry filters may be installed.

Problems and uses of air conditioning in large buildings and in industry are also treated in the booklet. The reader is advised, in closing, to be sure of competent advice and adequate equipment; to plan the control system when planning the air conditioning equipment; and, finally, to plan carefully for the future, whether the air conditioning system installed is to be made as a unit, or step by step.

## Big Demand for Air Coolers in Spain

MADRID, Spain—"There is a potential demand in Madrid for air-conditioning apparatus limited largely by the relatively high prices prevailing at present," states Curtis C. Jordan, American consul here. "The tendency in building new theaters, cafes, office buildings, and apartment houses is to adopt the most modern appliances, and this tendency is followed within the economic limits of the owners."

In Madrid only four motion picture houses—Capitol, Cine de la Opera, Palacio de la Musica, and Coliseum—and three cafes—Negresco, Aquarium, and Casa Blanca—have installed air-cooling systems, Mr. Jordan reports.

The local preference, is for the ice cooling system because it is lower in price. German equipment is purchased for the same reason, he says.

"It has been stated," he comments "that if American manufacturers could compete in price with those of other countries they would find the Spanish firms interested in their products."

In the construction of air-cooling apparatus, the electric fans are made by the Anglo-Espanola de Electricidad in Barcelona, the compressors come from England, and the rest of the machinery usually is purchased in Germany.

The three principal types of cooling systems are those of atomization of water, cooling the air by ice, and the use of compressors. The price of an installation capable of cooling a theater of 1,200 persons capacity, says Mr. Jordan, is from 145,000 to 200,000 pesetas. The Capitol motion picture house which used the compressor type system cost 500,000 pesetas. The peseta is worth about \$0.137 at present.

The following firms deal in air-cooling equipment: C. Ara, Marques de Cubas 1; Jacobo Schneider, Niceto Alcala Zamora, 23; and Pedro Gill Idigoras, Santa Engracia, 72.

Customs duties are levied upon the component parts of the apparatus. The amount of the duties may be ascertained from the Spanish consul or from the American consul's office. In the case of apparatus installed in the Capitol motion picture house, the duties amounted to 10,453.35 gold pesetas or 24,743.80 paper pesetas.

According to Sr. Ara, air-conditioning dealer, it is customary to pay 45

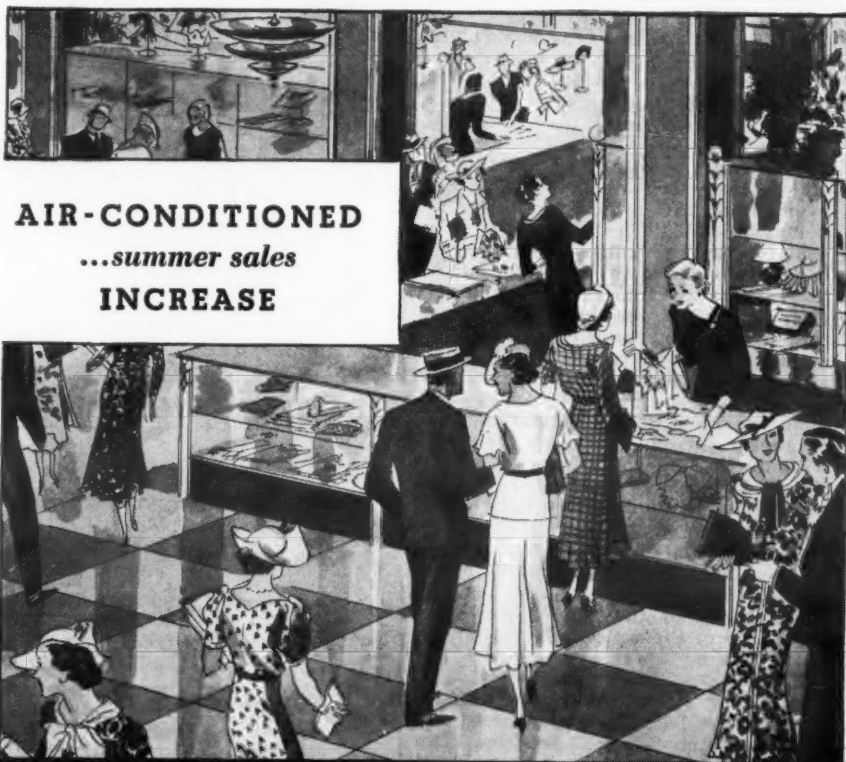
per cent of the cost upon the arrival of the machinery at the place where it is to be installed, 45 per cent when the machinery is functioning, and the remaining 10 per cent after three months. Sometimes 90 per cent of the cost is collected when the machinery is functioning and 10 per cent at the end of three months.

## Owens-Illinois Industrial Materials Dept. Moved To Newark Factory

TOLEDO—Completing the concentration of its industrial materials division in Newark, Ohio, the Owens-Illinois Glass Co., has recently moved the sales department of this division from Toledo to the Newark plant.

This large plant is devoted entirely to the production of "Dustop" replacement type air filters, insulating wool, glass silk, and other industrial glass products.

Garland Lufkin, formerly manager of the Owens-Illinois factory at Bridgeton, N. J., is now in charge of the entire operation of the industrial materials division. J. S. Irvine continues as sales manager.



## SELL THEM

more summer sales with "FREON" air-conditioning

**H**OW can we increase our summer sales? Until a few years ago, merchants faced this question every summer. Today, hundreds of stores throughout the country have overcome the seasonal warm weather slump. Air-conditioning has done it.

"It's too hot to shop" has given way to "Let's go to Blank & Company's air-conditioned store. It's not too hot to shop there now."

Department stores, specialty shops, and stores dealing in dry goods of every description have found cooling comfort a decisive factor in summer merchandising. Large stores have installed air-conditioning in sectional departments and on entire floors. Furs are now sold on hottest days. Sales of dresses, shoes, lingerie, corsets and many other items of wearing apparel increase where conditioned air makes summer shopping a pleasant experience.

When you sell air-conditioning to retail stores,

you not only sell them increased customer traffic in summer; you sell them more customers, more sales per customer, and many other advantages. Stock losses are reduced, and sales clerks are energetic and cheerful where cool, refreshing air provides an invigorating atmosphere. Many stores have found air-conditioning gives them a tremendous competitive advantage.

Because "Freon" is a safe, ultra-efficient refrigerant, it is used in practically all air-conditioning systems. "Freon" is non-toxic, non-flammable, and odorless. The superior qualities of "Freon" assure complete safety for customers and sales people, and for the costliest garments. "Freon" is the refrigerant used in air-conditioning installations in retail stores, hotels, hospitals, office buildings, restaurants, homes, railroad cars, and many other places.

Rich's, Inc., Department Store, Atlanta, Ga. Air-Conditioned with "Freon" by the York Ice Machinery Corp., York, Pa.



"Freon" air-conditioning makes Rubin's store, in Kansas City, a pleasant place to shop. Air-conditioning system installed by Servel, Evansville, Ind.



Cooling comfort is provided at Braunstein's, Wilmington, Delaware, with "Freon" air-conditioning. System installed by Westinghouse.



# FREON

REG. U. S. PAT. OFF.

a safe refrigerant

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE



## AIR CONDITIONING

### Detroit Edison Reports Results Of Home Cooling Research

By G. B. Helmrich, Detroit Edison Co.

TWO years ago The Detroit Edison Co. sponsored the installation of cooling equipment in a residence located in a Detroit suburb. This residence is about the same size as the University of Illinois Research Residence, but the total space cooled was considerably larger, consisting of four rooms each on the first and second floors and a maid's room on the third floor; a total of nine rooms with a volume of 19,200 cu. ft. All openings are weatherstripped and the walls are insulated with Cabots Quilt and the ceiling with balsam wool.

The winter heat loss of this house at a 70 degree differential is 93,000 B.t.u. During the summers of 1932 and 1933 cooling was accomplished by the use of ice and the operating results were discussed in papers presented at the last two annual meetings of the society. The ice equipment was replaced by a refrigerating machine and direct expansion cooling coil in June, 1934, and this equipment was operated during this past summer.

The cooling equipment consists of a two-ton refrigerating unit supplying Freon to a direct expansion forced convection cooling coil. The coil is placed in the main return air chamber of a conventional forced warm air heating system and no changes were made to the existing duct work except relatively minor ones to accommodate the coil.

The general arrangement is shown in Fig. 1. The operation of the machine is controlled by a low voltage thermostat located in the dining room. This thermostat is wired to control the operation of a solenoid valve placed in the liquid line supplying refrigerant to the cooling coils.

When the thermostat calls for cooling the liquid valve opens and allows refrigerant to flow into the cooling coil. When the vapor pressure in the coil has built up to about 40 lbs. the low pressure control closes the starting contactor and starts the refrigerating machine, which action automatically starts the circulating fan.

When the room temperature has been reduced to that of the thermostat setting the liquid valve is closed and the machine "pumps down" until the suction pressure is reduced to

about 7 lbs. at which pressure the low pressure control stops the machine, but the fan continues to circulate air until stopped by a conveniently located manual control. The control diagram is shown in Fig. 2.

The operation of the refrigerating machine is controlled by the low voltage thermostat "F" located in the dining room. When the thermostat calls for cooling, it energizes the solenoid operating the valve on the liquid line to the cooling coil and opens this valve, allowing refrigerant to flow into the coils.

When the vapor pressure in the coil has built up to about 40 lbs., the low pressure switch "H" closes and energizes the holding coil "E" in the compressor motor starter and closes the starting contactors in the 220-volt circuit supplying the motor and starts the motor.

When the room temperature has been reduced to that of the thermostat setting, the solenoid operator on the liquid valve is de-energized by the opening of the thermostat circuit, and valve "D" is closed.

The refrigerating machine continues to operate and "pumps down" until the suction pressure is reduced to about 7 lbs., at which pressure the low pressure control switch opens, de-energizes the holding coil "E," opens the starting switch and stops the motor.

As it was considered desirable to have the circulating fan start automatically with the starting of the compressor so that the occupants of the home would have only one operation to perform when desiring to start the cooling system; namely, to move the room thermostat to a setting below the existing room temperature, the 110-volt fan motor circuit was tied into two auxiliary contactors which were available in the starting box for the compressor motor.

The closing of the starting contactors for the compressor motor also closes contactor "G" in the 110-volt circuit supplying the fan motor. This action energizes the holding coil in magnetic switch "A," closing the fan motor circuit and starting the fan.

It is also desirable to have the circulating fan operate for an indefinite

period after the refrigerating machine shuts down so that there will be no tendency for the air to stratify in the rooms, and so that full advantage may be taken of the cooling effect produced by drawing the cool air from the lower levels and discharging it at higher elevations; as well as also taking advantage of the cooling effect of air movement. There is an additional advantage in that the residual cooling power in the coils can be utilized by the continued circulation of air after the refrigerating machine has stopped.

Although the refrigerating machine was usually shut down at about 8 or 9 o'clock in the evening, the fan was permitted to operate until the occupants were ready to retire, and then it was stopped by simply pushing the button in the momentary contact switch "B" located in the basement stairway.

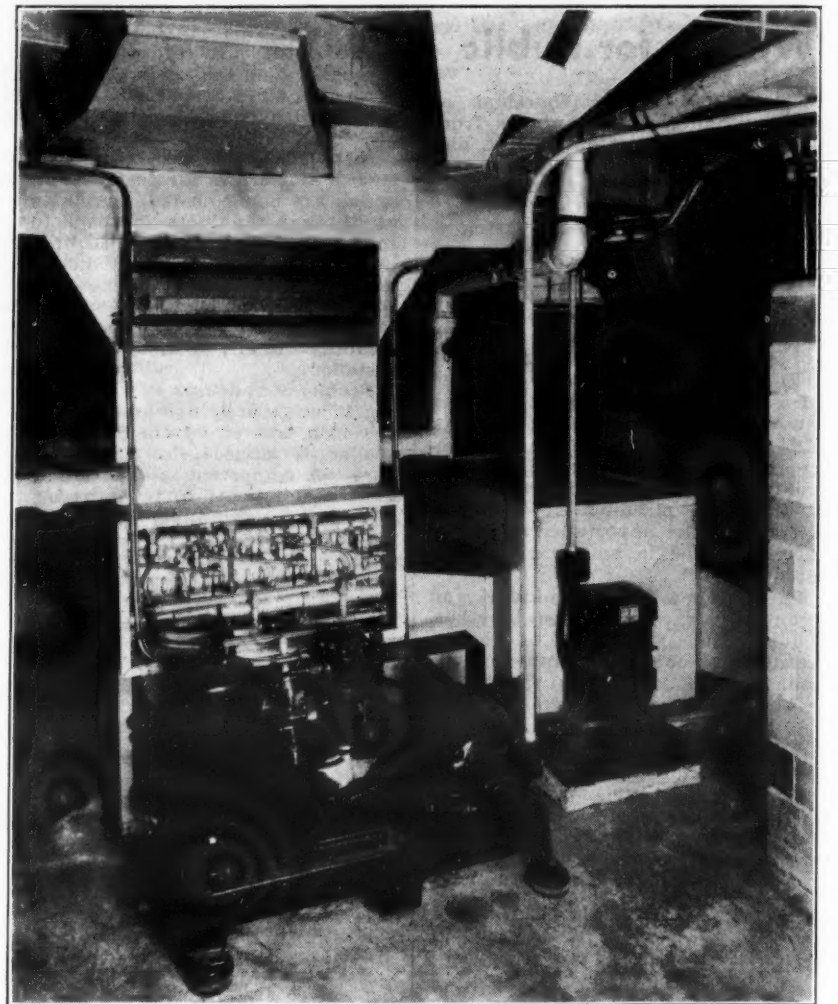
This manual control switch for the fan was also used to start the fan independently of the compressor if recirculation of air without artificial cooling was desired, or if it was desired to cool by bringing in outdoor air at night.

Switch "C," located in the same circuit as magnetic switch "A," was not installed at first, but it was found after a few days of experience that enough refrigerant remained in the cooling coil after the compressor was shut down to permit of a slow building up of pressure to a point where the low pressure switch came into operation and started the compressor. The compressor only turned over a few revolutions, of course, before the pressure in the coil was reduced to a point where the low pressure switch opened, and the compressor stopped.

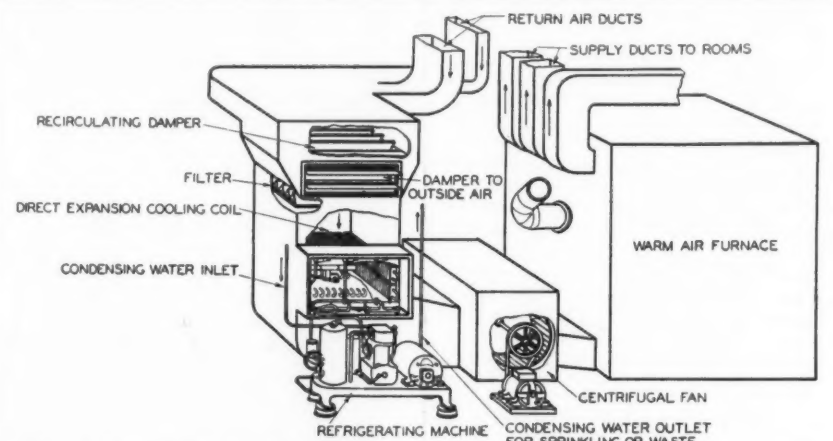
This so-called "re-cycling" of the compressor frequently took place in the early hours of the morning, and as this action automatically started the circulating fan, the house occupants awoke in the morning to find the fan running. The operation of the fan, under such conditions, was, of course, quite unnecessary and undesirable from the householder's standpoint, so magnetic switch "C" was installed with its holding coil connected to the 18-volt thermostat solenoid valve circuit. This holding coil in switch "C" was only energized when the thermostat was calling for cooling, and the solenoid valve had opened preparatory to starting the compressor.

Re-cycling of the compressor independently of the action of the thermostat, or, in other words, with the solenoid valve closed and the thermostat circuit open, will not cause the fan to start because under these conditions switch "C" will be open. The furnace-stat is connected in parallel

## System Used in Research



Photograph of central-type air conditioner in Detroit Edison research residence, showing condensing unit, cooling coils, damper, blower motor.



Drawing of Detroit Edison research house air-conditioning system made from above photograph, showing layout of system with various parts.

with the summer cooling controls so that the fan motor may be controlled in the heating season quite independently of the cooling equipment controls.

The control, as described above, was developed for experimental purposes, and probably is considerably more complicated than will be found necessary in most practical installations.

As a matter of fact, the two-ton refrigerating machine used in this installation proved to have capacity so well balanced with the cooling requirements that there was no tendency toward over-cooling. After the compressor was started it usually ran continually until shut down in the evening, and the thermostat proved to be rather unnecessary.

Of course we enjoyed the advantage of knowing definitely, by virtue of our previous experience with ice cooling, the cooling requirements of this house, and were able to choose a compressor with just the right capacity to maintain comfortable conditions without over-cooling.

The system was placed in service on June 12 and operated for 18 days for a total of 168 hours during the past season. Had the system been available on June 1, there would probably have been need for cooling on five additional days, according to temperature records. This would make a total of 23 days of artificial cooling for the entire summer.

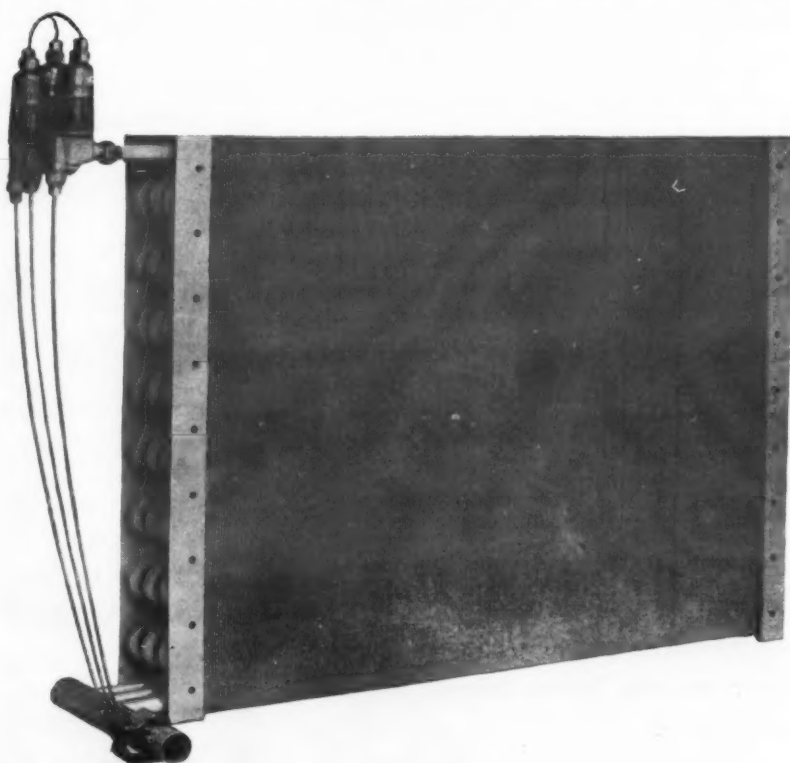
A comparison of the principal operating data with that for the previous two summers, when ice was used, is shown in the summary of operating data. Two very significant comparisons stand out in this summary; the hours of cooling per day of use are 50 per cent higher than in the previous summer, while the operating cost per hour of cooling is less than one-third that for previous summers.

The greater number of hours of use can be credited both to the ease with which the occupants of the home could start the cooling system and to the very low cost of operation. The net cooling accomplished by the machine

(Concluded on Page 15, Column 1)

## MCCORD STANDARDIZED Air Conditioning Surface

for direct expansion coils for Freon and Methyl Chloride



CAPACITIES: Unit assemblies for any load desired.

MAXIMUM DIMENSIONS, SINGLE UNIT: Height, 29 1/4 in., Width, 40 in., Depth, 5 1/4 in.

CONSTRUCTION: Continuous fins; 3/4 in. tubing, one row in depth; core and tube supports are nonferrous metal.

Sizes within above limits to suit your requirements. Send for catalog.

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Condensers, Evaporators, Cooling Coils, Convectors, Metflex Trays, Ice Makers

## Control Diagram

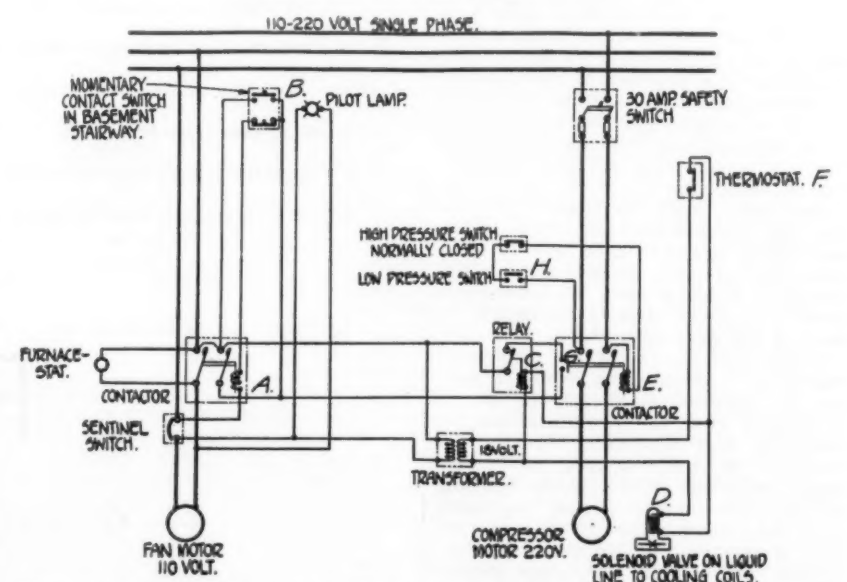


Fig. 2. Control diagram for Detroit Edison's research house cooling system, showing control points described in detail in accompanying article.



## Detroit Edison Co. Reports Results of Cooling Research

(Concluded from Page 14, Column 5)  
was approximately the same as that accomplished by the use of ice in the two previous summers.

The performance of the cooling system was measured both by recording instruments and by special tests and the results of two of these tests are given in the following tabulation.

### Tests of Cooling System

TEST OF JULY 13, 1934

Time	Outdoor Wet Bulb ° F.	Outdoor Dry Bulb ° F.	Rela. Hum. %	Living Room ° F.	Dining Room ° F.	Rela. Hum. %	Kitchen ° F.	Register- ing Room ° F.	Enter- ing Room ° F.	Leav- ing Air ° F.
3:15 p. m.*	87	78	80	62.5	66.5	67	74	65		
4:00 p. m.	74.5	90	48	..	..	..	..	..	74	64.5
5:15 p. m.	..	..	..	..	..	..	..	..	74	64

\*Cooling started at 2:45 p. m.

#### Condensing Water

Temperature of water entering condenser—62° F.  
Temperature of water leaving condenser—83° F.  
Quantity of water flowing through condenser—2.17 g.p.m.  
Heat rejected to cooling water—22,800 B.t.u.'s per hour.

#### Cooling Load

Latent Heat: Moisture condensed from air—2-hour average—3.87 lbs. per hour.  
Indoor relative humidity at start of cooling—63%  
Indoor relative humidity 2½ hours later—53%  
Latent heat load— $3.87 \times 1,056=4,100$  B.t.u.'s per hour.

#### Sensible Heat:

Air flow = 1,570 c.f.m.  
 $1,570 \times 60 \times .075 \times 0.2375$  (74-64)=16,900 B.t.u.'s per hour.

#### Total Cooling Load:

16,900 sensible—4,100 latent = 21,000 B.t.u.'s per hour.

TEST OF JULY 24-25, 1934

Time	Outdoor Dry Bulb ° F.	Outdoor Rela. Hum. %	Living Room ° F.	Dining Room ° F.	Rela. Hum. %	Upstairs South Bedroom ° F.	Enter- ing Room ° F.	Leav- ing Air ° F.
July 24—3:50 p. m.*	100	26	78.5	..	59	..	..	..
July 24—6:00 p. m.	100	..	79	81	..	80	75.5	65.5
July 25—10:00 p. m.	..	..	77.5	..	52	..	..	..

\*Cooling started at 3:50 p. m. July 24 and continued until 10:00 p. m. on July 25—30-hour run.

#### Cooling Load:

Latent Heat: Moisture condensed from air = 5.06 per hour.  
 $5.06 \times 1,056 = 5,350$  B.t.u.'s per hour.  
Sensible Heat:  $1,570 \times 60 \times .075 \times 0.2375$  (75.5-65.5) = 16,800 B.t.u.'s per hour.  
Total Cooling Load: 16,800 sensible—5,350 latent = 22,150 B.t.u.'s per hour.  
Note: No windows on either floor of the residence were opened during the 30-hour cooling period and no outdoor air was drawn in, the air being completely recirculated.

These test results, together with observations made by the occupants, indicate that the cooling system had sufficient capacity to hold the downstairs temperature to an average value of 78° F. and effective temperature of 71 to 72°. On the hottest day last summer, July 24, when the outdoor temperature exceeded 100° F. for a period of three hours, the first floor temperature did not exceed 79° F. in the living room.

As previous tests had shown that, without cooling, the indoor temperature would have risen to about 85° F. under corresponding outdoor conditions, the cooling system can be credited with an average reduction of indoor temperature of seven degrees. In addition to this reduction in temperature, the relative humidity was appreciably reduced.

Indoor relative humidities at the start of cooling of the order of 67 to 71 per cent were reduced to 60 to 63 per cent at the end of two to three hours of cooling and the relative humidity at the end of the cooling periods was of the order of 50 to 55 per cent. The amount of moisture condensed from the air by the cooling coils varied between four and six pounds per hour on the days that tests were made.

The performance of the cooling system throughout the summer was

and continued until 10 p. m. on the following day.

No windows were opened during this cooling period and, on the second day the upstairs temperature varied between a minimum of 73° F. at 6 a. m. and a maximum of 79° F. at 8 p. m. while the downstairs temperature did not exceed 78° F. Although no outdoor air was drawn into the system, the occupants reported that the condition of the air in the sleeping rooms was very satisfactory. The reduction of the indoor relative humidity to a minimum of 52 per cent at the end of the cooling period was undoubtedly a large factor

caused by a quiet operating oil burner. They did not feel that it was at all necessary to house the machine in a sound proof box.

The summer's experience with this installation gives rise to certain observations which are deemed of sufficient significance to emphasize in this discussion.

1. In this climate it is quite feasible to cool a moderate-sized residence very satisfactorily with a two ton refrigerating machine if the house is well insulated and awnings or blinds are used at the windows. Certainly a three ton machine should be large enough even for a house which is only fairly well insulated.

2. Except under unusual circum-

stances, it is not necessary, nor even desirable, to supply outdoor air to a residential cooling system as natural infiltration will usually provide all the ventilation which may be required. Sleeping rooms can be satisfactorily cooled without introducing outdoor air.

3. Since the compressor capacity was somewhat less than would have been required to maintain what may be termed "ideal" conditions, there was no tendency toward over-cooling, and the room thermostat could very well have been eliminated and the installation cost correspondingly reduced.

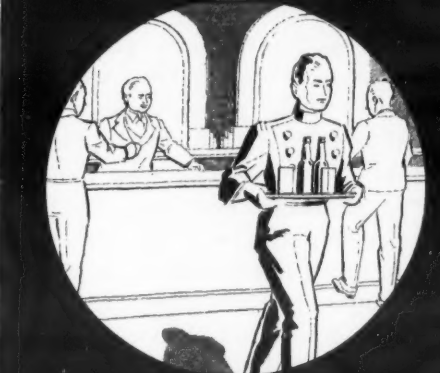
4. There was no objectionable lamp flicker caused by the running of the

compressor although the number of fluctuations per second (compression intake cycle) was 9.7, which is rather low. The most troublesome frequency has been found to be about 6 or 7 fluctuations per second. Laboratory tests were made on three well known makes of compressors of 2 to 3 ton capacity, with fluctuation rates ranging from 9.7 to 39 per second, and it was found that no really noticeable light flicker would result under conditions usually found in residential lighting circuits.

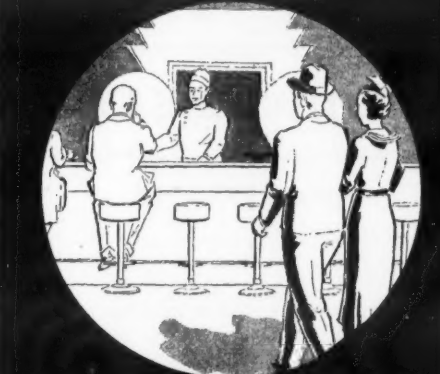
5. A total operating cost of \$19.00 for a cooling season can certainly be considered very moderate, and should be no obstacle to the growth of this class of comfort cooling.



APARTMENT REFRIGERATION



BAR REFRIGERATION



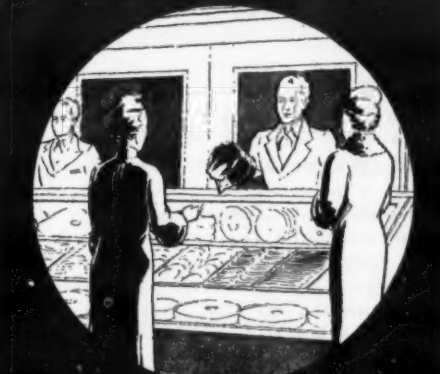
SODA FOUNTAIN REFRIGERATION



DOMESTIC REFRIGERATION



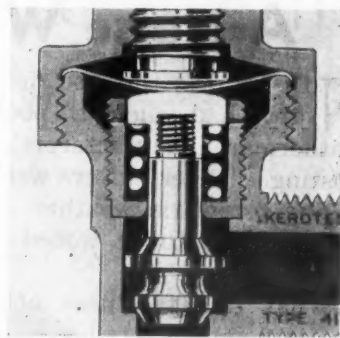
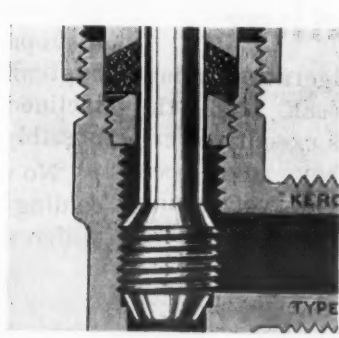
RAILROAD CAR AIR CONDITIONING



STORE REFRIGERATION



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Denver, Colo.	Robert L. Chambers	Austin Jones	..
Denver, Colo.	13618 Santa Rosa Drive	Thomas B. McLaughlin	..

### FOREIGN REPRESENTATIVES

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Europe and South America	F. C. Lovelock, Ltd.	P. O. Box 329 Puerta de Tierra, San Juan.	..
Melchior, Armstrong, Dessau Co., Inc.	..	..	..

## Summary of Operating Data

	1932	1933	*2-Ton Ref. Machine
Cooling Medium	Ice	Ice	Ice
Total number of degree hours above 85° F. during summer	529	1,408	1,345
Number of days of artificial cooling	22	22	18½
Number of hours of artificial cooling	135	134	168
Number of hours of fan use only:			
Outdoor air cooling	57	120	6
Recirculation	..	..	114
Total number of hours of fan use	192	254	288
Average number of cooling hours per day	6.1	6.1	9.3
Electric Energy Used			
1932-1933—Ice water pump and fan kwh.	94	142	..
1934—Compressor and fan kwh.	..	..	476½
135 kwh. for fan and 341 for compressor.	..	..	..
(Power required by compressor—2.04 kw.)	..	..	..
Condensing Water for Compressor			
Gallons of water per minute of operation, average	..	..	2.07
Total water consumption for season, gallons	..	..	20,920
Cost of Cooling for Season			
Ice—1932-1933	\$45.60	\$30.60	..
Electricity at 2½ cents per kwh.	2.12	3.20	\$10.71
Condensing water at 20¢/M. gal.	..	..	4.18
Total operating cost	\$47.52	\$33.80	\$14.89½
Average cost per day of artificial cooling	\$2.16	\$1.54	\$0.83
Average cost per hour of artificial cooling	\$0.35	\$0.25	\$0.09

\*Condensing Unit: Refrigerant—Freon; 2-cylinder compressor—400 r.p.m.; 2-hp. motor—220 volt, single-phase, repulsion-induction. Direct Expansion Cooling Coil: Size of coil bank—29x25x9½ in. deep 4.1 sq. ft. face area; face velocity of air through coils when handling 1,570 c.f.m.—356 f.p.m.; actual static pressure drop through coils operating coil pressure—40 to 45 lb. per sq. in.; operating coil temperature—43 to 48° F. †There were five cooling days in June when machine was not available; corrected cost for the entire season of 23 cooling days = \$19.05



## ELECTRIC REFRIGERATION NEWS

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## Industry Puzzled by Adverse Weather

NEVER has the electric refrigeration industry had such a poor break from the weatherman, manufacturers' sales executives are insisting. Week after week they have been waiting for warm weather, and even yet Spring coyly refuses to be wooed into any kind of a steady liaison.

What this tardiness of the arrival of hot days is doing to retail sales, of course, is highly disturbing to those who spend their days watching the progress of curves on sales charts. Sales of household electric refrigerators by manufacturers during the first quarter of the year smashed all previous records; but retail sales, movement of boxes off dealers' floors into owners' kitchens, have admittedly been much slower. And it is an open secret that manufacturers' sales to distributors and dealers have fallen off during the last few weeks.

### Weather Man Seems to Be Culprit

Whether or not the blame for this rather disappointing state of affairs can be affixed to the weather is a matter which can never be proved. But the evidence at hand does seem to make such a theory plausible.

For instance: In the South sales have been excellent. In the Far West, and in other localities where warm weather has been recorded, dealers have no complaints at all. Furthermore, in the shivering sections of the nation, whenever and wherever the sun has shone brightly and the thermometer has risen encouragingly for a few days, sales of household electric refrigerators have skyrocketed during those tantalizingly short periods.

As one field representative wrote us from Wichita, Kan., the other day: "It looks like my trip 'down to meet spring' will be highly successful; movement of boxes is noticed at once whenever sun comes out and temperatures start upward."

### Human Nature the Same Everywhere

An executive of an Australian manufacturing concern, who was a recent visitor to the office of ELECTRIC REFRIGERATION NEWS, declares that the weather is an all-important factor in sales down there, too. "One of the first things an applicant for a sales position tells us," laughs this visitor from the Antipodes, "is that he has a sure method for selling refrigerators in inclement weather. But his scheme, like all its predecessors, is invariably a dud."

The weather, of course, has always been a vital factor in making electric refrigeration a seasonal business. All sorts of schemes have been tried, generally without a notable deal of success, to spur sales during the fall and winter months. But it seems that householders simply can't be interested in buying electric refrigerators when it's cold out-of-doors.

Some merchandisers claim that this condition

is partially a phobia of salesmen, that if the proper incentives are applied—and attractive plans worked out for prospects—sales can be made in cold weather. It certainly is true that adequate refrigeration is a necessity the year-round, and many good sales stories have been built around that point.

### No Plans for Late Spring Exigency

Previously, however, all such stories, plans, and incentives have been figured out for the fall and winter months. What to do when spring doesn't come is a situation which hasn't faced the industry before to any serious extent, and so this year sales managers find themselves unprepared for an unexpected exigency.

What will happen when hot weather does finally come is the question which sales executives are pondering right now. Will the selling season extend considerably longer than heretofore? That's what they're hoping, it's needless to say.

### Will Season Extend into Fall?

In previous years sales have begun to slow up in August, fall off considerably in September, and almost collapse in October and November—reviving somewhat late in December for the Christmas trade. This year, some are daring to hope, the active season may extend well into September. More pessimistic sales managers are inclined to think that sales lost in April and May possibly will not be recovered this year.

No matter what happens—barring a complete folding up of sales for the rest of the year, which doesn't seem at all likely—the year should be a good one, however. Manufacturers sold nearly half a million household electric refrigerators during the first quarter of this year; and it doesn't seem too much to expect that this figure should be tripled before the year is out.

## WHAT OTHERS SAY

### Star Salesmen Wanted

THERE are some fundamental principles which are recognized and accepted as basic in successful sales management.

One of these is to make and maintain proper contacts with influential prospects. Another is to exercise good judgment in proportioning the expenditure of sales energy.

To illustrate by citing "opposites," it would not be good management to permit your competitor to monopolize contact with your most important customers, men whose buying decisions could make or break your business. Nor would it be good management to keep star salesmen gunning for ten-dollar orders when their aim and ammunition are equally capable of bagging \$10,000 ones.

Elementary, isn't it?

Then why do you not apply these principles to the most important selling job that you have had or probably ever will have to do; a sales job that will determine, unquestionably, the future fate of your business?

Let's consider what has happened to bring this sales opportunity about.

There was a time when your volume and profits were determined by the developments in seller and buyer relations. That was before the depression. Then came the NRA, with the transfer of control of industry and hence of your volume and profits into an Administrative branch of Government. And now, as the sadly plucked Blue Eagle is preparing to fly away, comes another transfer of control; not back again to seller and buyer, but to Congress.

Make up your mind to it that there is where final decisions governing your volumes and your profits are going to be made for some time to come.

Your competitors, the A. F. of L., as well as all of the other anti-initiative, anti-industry, anti-business groups, who preach the doctrine of essential conflict between employer and employed, recognize this fact. And they are virtually monopolizing the contacts with men whose decisions will make or break your business.

Right now, these competitors of yours have several hundred of their star salesmen at work selling Congressmen, through individual contact, the 30-hour week idea, the Wagner-Lewis bill, a social security program that is but 10 per cent thought out, new teeth for 7-a, prevailing wage rates for relief work, and a long list of other high-priced products.

These salesmen, your competitors, are out after billion-dollar orders while you are concentrating on ten-dollar ones. They will get the order unless you get busy, and it will be because of superior salesmanship.

Industry should organize its star salesmen in every community, now, in a personal sales campaign devoted to individual Congressmen. Sell them the fallacy of your competitors' 30-hour week and the superior merit of the practical idea that only by producing goods can we all enjoy them. Get these Congressmen to visit your plants and talk to your workmen so that they will come to realize that mutuality of interest, not antagonism, is the philosophy to be fostered.

Here, indeed, is a sales campaign involving billions in future volumes, wages, and profits which should intrigue the liveliest star salesmen of our industry!—*The Iron Age*.

## LETTERS

### Progressive Mississippi

Southern Appliances, Inc.  
1711 St. Charles Ave.  
New Orleans, La.

Editor:

I note in an article on the front page of the May 8 issue of ELECTRIC REFRIGERATION NEWS that mention is made that electric refrigeration has not yet received public acceptance in the state of Mississippi.

I would like to call your attention to the fact that Mississippi Power Co. with headquarters at Gulfport, Miss., has just completed an eight weeks' campaign during which time they sold a total of 905 electric refrigerators in their properties. This company has a total of 25,000 domestic meters. This means that in eight weeks time they sold 3.55 per cent of their total meters, which is a national record.

We are mighty proud of the accomplishment of F. M. Turner, manager of the merchandise division of Mississippi Power Co., and we could not let one of our star accounts do such a fine job without calling it to your attention.

While the purchasing power is not high in Mississippi as you know, they still have to keep their food cold to keep it from spoiling and good consistent sales effort plus a good product will always win out.

W. B. STRINGHAM,  
President.

### Credit Where It's Due

Westinghouse Electric & Mfg. Co.  
200 East Fifth St., Mansfield

Editor:

Knowing that you are almost fanatical about the veracity of news appearing in your editorial columns, I am forced to clear up an apparent misunderstanding in regard to a recent statement about the design of the Coca Cola coolers.

In a recent issue of ELECTRIC REFRIGERATION NEWS you have a comment that the Coca Cola cooler was designed by Mr. Tull of our East Springfield engineering department.

The Coca Cola cooler cabinet was designed by Everett Worthington, a professional designer from Chicago who worked on this particular job under the sole direction of the Coca Cola Co.

Mr. Tull of our East Springfield engineering department was brought into the picture by doing considerable work on the development and design of the Westinghouse hermetically sealed compressor units used in these Coca Cola cabinets. Actually, Mr. Tull had nothing to do with the design of the Coca Cola cooler cabinet.

I just wanted to clear this up with you so that all parties concerned will understand that we are anxious to give credit where credit is due.

R. O. RICHARDS,  
Press Bureau.

### Consumers Research Again

Mitchell Sales Corp.  
609 Fourth St., Bremerton, Wash.

Editor:

Will you please forward to us the address of the Consumers Research? We are anxious to obtain this year's publication.

Should you carry this publication or distribute the same, please forward a copy collect to this office.

H. A. SMITH,  
Sales Department.

Answer: Address Consumers' Research, Inc., at Washington, New Jersey (not Washington, D. C.).

3412 35th Ave. So.  
Minneapolis

Editor:

Please enter my subscription for one year to ELECTRIC REFRIGERATION NEWS. Enclosed find check to cover same.

I would like to read something in your publication about Consumers Research recommendations. If I know nothing of electric refrigerators and gave any consideration to their recommendations, I wouldn't buy any. How about it?

F. A. SUSS.

Answer: Consumers' Research specializes in publications which lambast manufacturers, advertisers, and business in general. The promoters of the enterprise are so indignant about everything that their information is frequently unreliable.

"I should like to continue to receive your excellent paper."—A. G. Winkler, Advertising Manager, Heating Journals, Inc., 167 Madison Ave., New York City.

"Attached on card you will notice three dimes for which please mail me three copies of March 20 issue REFRIGERATION NEWS. This issue is worth a dollar of anyone's money."—G. C. Brannon, P. O. Box 193, Lexington, Miss.

### They Want the Manual

1236 W. Pratt St.  
Baltimore, Md.

Editor:

I have received the information that you have or you are about to publish a manual on servicing electric refrigerators. If this is true please let me know when and where it can be bought and the price of same.

B. GRIFFITH.

Answer: See below.

The A. J. Alsdorf Corp.  
223 W. Jackson Blvd., Chicago

Editor:

One of our friends has asked us to secure for him a copy of the Refrigeration Service Manual.

Will you please advise us who issues this publication so that we can secure a copy of same?

Thanking you in anticipation of your kindness, we remain:

B. DRAZDIK.

Answer: See below.

Bell Radio Shops  
70 First St., Swanton, Vt.

Editor:

What good manual can you recommend for a fellow who is trying to service a few small jobs and who has had experience with the Leonard and has a general idea of service but all the different models require some service data knowing which course to follow.

W. E. BELL.

Answer: See below.

Mechanical Crafters Co.  
319 S. 16th St., Easton, Pa.

Editor:

A Mr. Klingler, who visited us recently in connection with refrigeration parts, suggested that we write you to inquire when the electric refrigeration Service Manual will be ready. We believe that this manual will be of benefit to us, and we would like to know what procedure to follow in order to obtain it.

Kindly consider this our formal subscription to ELECTRIC REFRIGERATION NEWS.

MECHANICAL CRAFTERS CO.

Answer: See below.

J. L. Levy & Son  
207 McLean St., Ligonier, Ind.

Editor:

Please advise me if you have a service manual on all makes of refrigeration. Kindly advise me to the same.

MILO F. MILLER.

Answer: We have been working very hard in an effort to get material together for the Master Service Manual covering servicing of all makes, but we are not ready to announce a publication date for this book.

Published in the April 10 issue of ELECTRIC REFRIGERATION NEWS was the first of a series of articles on principles of refrigeration and service fundamentals which will later be incorporated in the Master Service Manual. It will be some months before this series is completed and other material collected and prepared for presentation in the manual.

## BOOKS

### 'If You Want to Get Ahead'

Author: Ray W. Sherman. Publisher: Little, Brown & Co., Boston. Pages: 186. Price: \$1.50.

This book contains a collection of simple, practical suggestions for the man who wishes to increase his capacity for earning money. It is written for the average man who dreams about getting ahead, but doesn't know just how to go about it.

There is nothing astounding about the facts it sets up. They are the little, seemingly insignificant things; which most men overlook, or consider too trivial for consideration; which successful men have used in getting where they are.

One of the things Mr. Sherman advocates is: "Do what you already know you ought to do, and stop doing what you know you shouldn't." This principle, he believes, if put into active daily practice, will be the first step in the process of getting from the job you have to a better one.

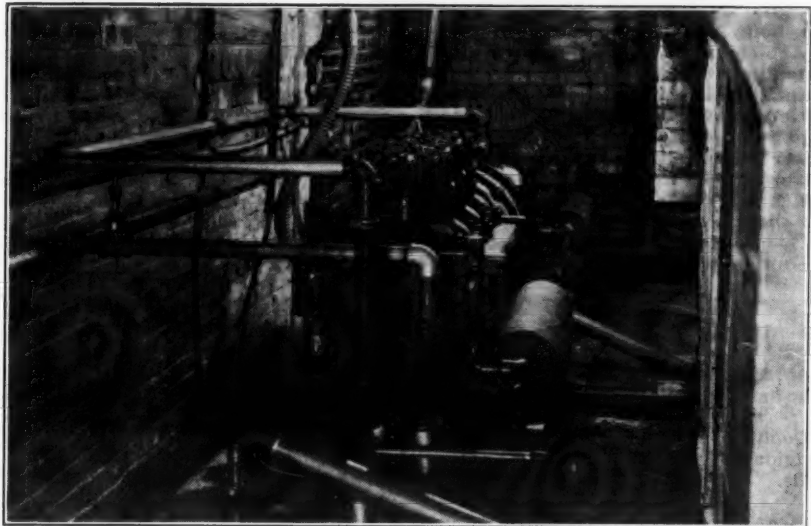
In his own words, his book is, "a record of thirty years of observation of American business men."

By the introduction of many brief, pertinent anecdotes, the methods suggested are explained and re-iterated. These example-stories not only aptly illustrate the points which the author makes, but they rid the book of any patronizing or dictatorial air.

"If You Want To Get Ahead," is a book you may read with profit if you find, in taking mental inventory, that where you are does not coincide with where you want to be.



## Westinghouse Units Cool Theater



Two 18-ton Westinghouse compressors and a central supply conditioner supply cool comfort to patrons of the American theater in Evansville, Ind.

## Miami Installations Increase 500%

(Concluded from Page 1, Column 4)

that while no special effort has been or is being made to promote air conditioning in the home, a number of installations will follow as a result of activity in the commercial field, states D. P. Caldwell, division sales manager of the Florida Power & Light Co. The small commercial business place offers the greatest possibilities for volume sales during 1935 in the opinion of Mr. Caldwell.

He says that the Florida Power & Light Co. began the promotion of air-conditioning business in Miami in January, 1934, by interesting several business establishments in receiving estimates of the installation cost.

Surveys were made and the results, including drawings, were sent to various manufacturers for bidding. By the end of April there were six air-conditioning equipment dealers in Miami and by the middle of June there was one installation.

The Air-Conditioning Council of Southeastern Florida was organized after several dinner meetings attended by all the dealers. Air conditioning was sold to a beauty shop operator as a result of an air-conditioned room placed on display at an electrical show sponsored by the Electric League.

Personal contacts made by the dealer salesman and the utility salesman were responsible for the majority of the prospects discovered and sold, but promotional activity produced some installations.

Thickly populated enclosures such as department stores, or apartments, and offices without cross ventilation, require comfort cooling every day in the year. Dealer members of the Air-Conditioning Council of Southeastern Florida agreed, after a study of weather conditions, to use 91° dry bulb temperature and 79° wet bulb temperature for design purposes.

In Miami the maximum dry bulb temperature is 93° F. while the wet bulb is 81°. Air-conditioning plants must be designed for 91° dry bulb and 78° wet bulb, because of weather conditions peculiar to a section within approximately a 15-mile radius.

## Central System Used To Air-Condition 'Moto-Homes'

NEW YORK CITY—Design and operation of the air-conditioning and refrigeration systems in prefabricated homes, which have attracted wide attention among heating, ventilating, and refrigerating engineers, not only because of their novelty but also because of the large potential field which they open in the lower income classes is illustrated by the prefabricated houses which American Houses, Inc., makes.

This house, known as the Moto-home, can be classed as typical of structures of this type.

Mechanical equipment for the homes, which may be had in either one or two-story styles, is enclosed in a large metal cabinet known, in this case, as the moto-unit. This is designed to fit between the kitchen and the bath, extending up to the second floor in two-story houses.

An electric exhaust for the kitchen also connect with the bathroom. For warm climates, it is arranged to connect with the roof air space.

Built into the moto-unit is an electric refrigerator, sink, and electric dishwasher. In the larger homes, there is an electric clothes washer. The owner may have a gas or electric stove, whichever is more economical in his community.

The reverse side of the moto-unit forms the bathroom. Beneath the lavatory is an auxiliary electric heater, which blows warm air into the bathroom on chilly mornings.

Every house is air conditioned, including cooling in the summer. The method used is that of an indirect conditioner, with a steam boiler supplying the conditioner unit, the conditioned air being distributed by ducts in the various rooms.

The boiler can be fired by oil, gas, or coal. Since the house is highly insulated, the boiler and burners are very small units.

Recirculated air is drawn up from beneath the floor, this space being used as a plenum chamber, and lined with sheet metal insulation. The

boiler and compressor are mounted on the floor, while the indirect conditioning unit is placed near the ceiling.

A centrifugal blower forces the air through a glass wool filter, over an extended cooling surface connected to a condensing unit. A drip pan beneath the cooling surface drains off the condensate from the cooling coils. The air then passes over the heating surface, finally through a humidifier, and then to circular ducts which run between the bracing in the joists above the ceiling.

A two-speed fan is used, run at low speed during the heating season. During the summer, the refrigerating capacity is sufficient to cool two rooms to 10° below the outside temperature, with the fan at low speed. It is possible, however, to cool the entire house to some extent. To do this, the fan is set at high speed.

The air-conditioning units are made in four sizes, which have sufficient range to take care of any of the various sizes of houses which the company makes.

Heating capacities of these four units are 45,000, 55,000, 70,000, and 90,000 B.t.u.'s per hour. Cooling capacities are one ton for the three smaller units, and 1½ ton for the largest.

The blower, which is of the Sirocco type, in the smallest house has a capacity of 500 c.f.m. when on low speed and 750 c.f.m. on high speed. Low and high speeds of the other three units are: 750, 950; 950, 1150; 1150, 1300 c.f.m.

The cooling capacity is said to be sufficient to cool two rooms in the house to 10° below outside temperatures and maintain a 50 per cent relative humidity. When cooling the whole house, a temperature differential of 4° can be maintained, with a 50 per cent relative humidity.

Design of the heating and air-conditioning unit precludes any great amount of installation work. The manufacturer claims this can be done in a few hours.

## An Invitation

TO A. S. R. E. IN CONVENTION

The management of Temprite Products Corporation extends a cordial invitation to members of A. S. R. E. attending convention in Detroit to visit the factory and witness demonstration of Temprite beer, beverage, and water instantaneous coolers. Just call Mr. Lesley at Madison 8212 and appointments will be arranged.

TEMPRITE PRODUCTS CORPORATION

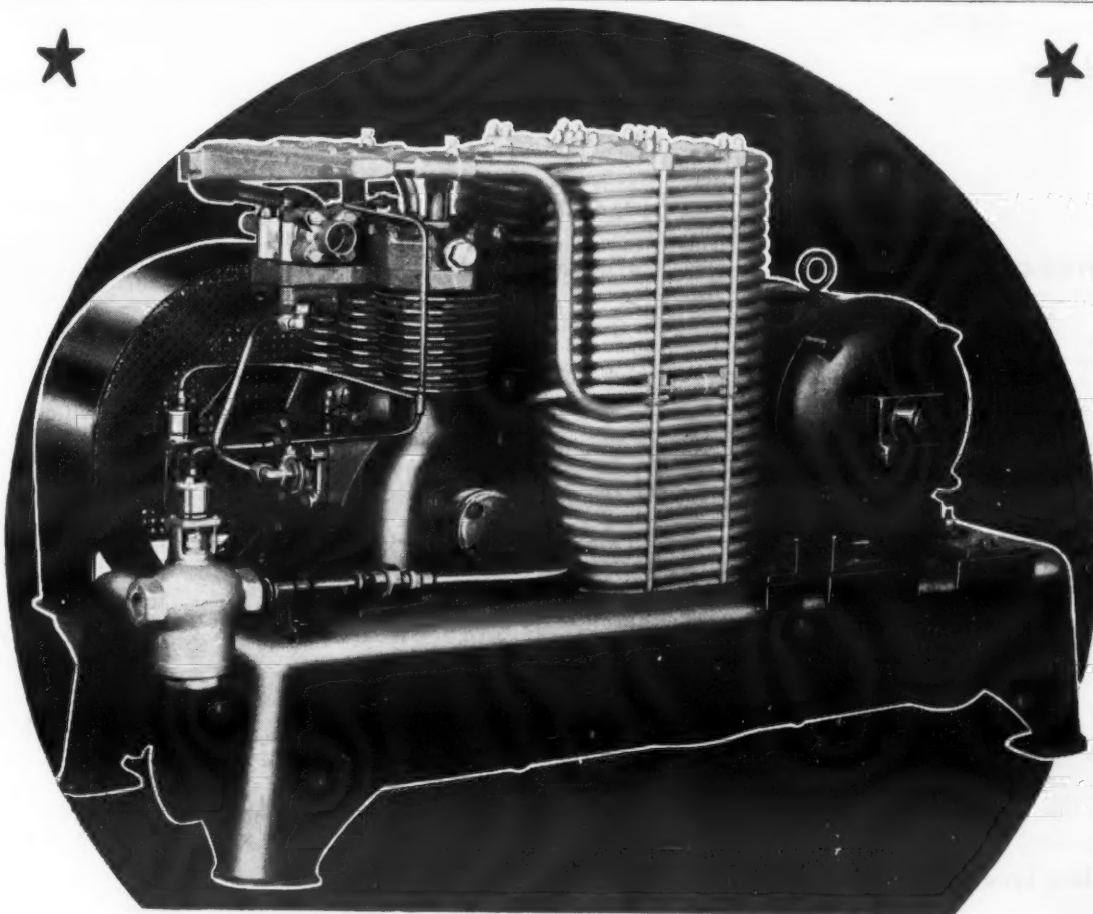
DETROIT

MICHIGAN

Originators of Instantaneous

Liquid Cooling Devices

1349 EAST MILWAUKEE AVENUE



## Condensing Units for Air Conditioning In Steadily Increasing Demand



Universal Cooler condensing units have been developed by engineers thoroughly conversant with the exacting requirements of the Air Conditioning industry.

The line is complete, from the small units for self-contained room coolers to the larger machines for both domestic and industrial cooling. They are charged with either Freon or Methyl Chloride.

The steadily increasing demand for Universal Cooler condensing units and the prominent position which the Company enjoys in the Air Conditioning industry are evidence of the genuine value, superior performance and integrity of the craftsmanship which characterize each unit. These also form the foundation for Universal Cooler Corporation's future growth.

**UNIVERSAL COOLER CORPORATION**  
DETROIT, MICHIGAN  
BRANTFORD, ONTARIO

MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

Table 1.—Data on Individual Installations in Miami

Establishments	Compressor Hp.	Approximate Cost	Dealer
Funeral Home			
A	7½	\$3,200	Geo. LaVigne Co.
B	7½	3,700	Domestic Ref. Co.
Beauty Shop			
A	1 @ 10 & 1 @ 5	5,000	Fuel Oil Co.
B	2 @ 5	3,500	Fuel Oil Co.
Department Store 5 & 10¢ Store			
A	6 @ 10	16,000	Fuel Oil Co.
B	4 @ 15	10,000	Auto. Ref. Co.
Stores—Ladies Apparel			
A	1 @ 15 & 2 @ 7½	9,522	Hartford, Conn.
B	3	1,803	Fuel Oil Co.
Restaurant			
A	10	3,050	Fuel Oil Co.
B	7½	2,750	Davidson & Co.
Utilities	1 @ 3 & 1 @ 5	4,000	Davidson & Co.
Manufacturer—Candy	2	1,000	
Commercial Office—Optician	1	600	Fuel Oil Co.
Office, Private			
A	1	600	Davidson & Co.
B	1	540	Geo. LaVigne Co.
C	¾	580	Domestic Ref. Co.
Residence	1	540	Domestic Ref. Co.
Apartments	2	1,190	Fuel Oil Co.

Table 2.—Summary of Miami Installations

Type of Establishment	Prior to 1934			During 1934			Total Thru 1934		
	No.	Tons	Hp.	No.	Tons	Hp.	No.	Tons	Hp.
Funeral Homes	2	12	16%	2	12	16%	2	12	16%
Beauty Shops	2	34½	29½	2	34½	29½	2	34½	29½
Department Stores	2	112½	144½	2	112½	144½	2	112½	144½
Stores	2	33¾	37%	2	33¾	37%	2	33¾	37%
Restaurants	1	33¾	50	2	17½	23	3	50¾	73
Utilities	1	8	14	1	8	14	1	8	14
Manufacturing	1	2	2	1	2	2	1	2	2
Commercial Offices	1	1	1	1	1	1	1	1	1
Offices, Private	3	2½	2%	3	2½	2%	3	2½	2%
Broadcasting	1	19	24%	1	19	24%	1	19	24%
Theaters	3	283	425	..	..	..	3	283	425
Residences	1	¾	1	1	¾	1	2	¾	1
Apartments	2	2	2	2	2	2	2	2	2
<b>Total</b>	<b>4</b>	<b>316¾</b>	<b>475</b>	<b>20</b>	<b>245½</b>	<b>299</b>	<b>24</b>	<b>561¾</b>	<b>774</b>



# SPECIFICATIONS OF AIR-CONDITIONING UNITS

Specifications of 266 air conditioners which use electric refrigeration for cooling are presented on pages 18, 20, 22, 24, 26, and 28 of this issue.

Specifications of 1935 air-conditioner models were published in the March 27 issue of *ELECTRIC REFRIGERATION NEWS*. However, due to the fact that the manufacturers were given a comparatively short time in which to prepare the data, much information was left out in some tabulations.

With the feeling that the omission of such important data was undesirable to everyone concerned, *ELECTRIC REFRIGERATION NEWS* requested manufacturers to revise and add to the information which they had originally submitted, for re-publication in this issue of *ELECTRIC REFRIGERATION NEWS*.

Manufacturers were asked to supply data by four different classes of equipment: (1) self-contained room air conditioners, with the compressor

furnished by the manufacturer inside the cabinet; (2) floor-type air-conditioning cabinets for remote installation of the compressor; (3) suspended-type overhead air conditioners for remote installation; (4) duct-type equipment which is usually installed in a basement or other convenient place from which ducts distribute the air.

Cooling capacity of the units unless otherwise specified, is given in B.t.u.'s

per hour with entering air at 80° F. dry bulb and 50 per cent relative humidity and with a saturated refrigerant temperature of 40° F. at the outlet of the evaporator for direct expansion systems and an entering water temperature of 40° F. for cold water circulating systems.

Heating capacity is given in B.t.u.'s per hour with a 2-lb. steam supply, and entering air at 70° F. dry bulb. Humidification capacity is given in

lbs. of water evaporated per hour with entering air at 70° F. and 30 per cent relative humidity.

When manufacturers use some other standard set of conditions for rating their equipment, the variations are noted by the use of asterisks.

Prices are list f.o.b. factory unless otherwise specified.

Blower capacity is given in cubic feet per minute, and velocity in discharge in feet per minute.

## Frigidaire

Frigidaire Corp., Dayton, Ohio

**Functions**—Self-contained type: SC-38 and SC-75, cooling and dehumidifying; SC-40, SC-80, and SCV-66, cooling, dehumidifying, and cleaning; SCVH-66, cooling, dehumidifying, cleaning, heating, and humidifying. Remote floor type: H-3, V-3, and R-100, cooling and dehumidifying; H-4 and V-4, cooling, dehumidifying, heating, and humidifying; RV-66,

cooling, dehumidifying, and cleaning; RVH-66, cooling, dehumidifying, cleaning, heating, and humidifying. Cleaning extra on R-100. Suspended type: S-3, S-150, SU-34, and SUD-34, cooling and dehumidifying; SUH-34, cooling, dehumidifying, and heating. Reheat coil on SUD-34. Cleaning extra on S-150, SU-34, SUH-34, and SUD-34.

**Compressor**—Frigidaire 2-cylinder with Delco motor, pressure control, and high side safety cut-out. Remote floor type has refrigerant heat interchanger.

**Cabinet**—Self-contained type: models SC-38, SC-40, SC-80, and SC-75—grained walnut finish; others—buff. Remote floor type: H and V models—burled walnut lacquer finish; R models—buff. Suspended type: model S-3—ungrained mahogany lacquer finish; model S-150—brown wrinkle finish on steel.

**Blower**—Self-contained type: model SC-38—screw type, trailing blades; SC-40—cone type trailing blades; others—double centrifugal and screw

type. Remote floor type: double centrifugal and screw type. Suspended type: S models—propeller; SU models—twin centrifugal blowers.

**Cooling System**—Direct expansion. Frigidaire cross-fin copper cooling coils.

**Heating System**—Frigidaire copper heating coils.

**Air Cleaning Medium**—Filter.

**Air Circulation**—Self-contained type: air intake in back, air discharge in top; fresh air intake on models SCV-66, SCVH-66, SC-40 and SC-80: adjustable grilles. Remote floor type: air discharge in top; fresh air intake on models RV-66 and RVH-66. Suspended type: air intake in rear, discharge in front. Adjustable diffusers on SU models.

**Controls**—Thermostatic expansion valve, liquid line solenoid valve.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity* Dehumid. Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self Contained</b>																
SC-38	\$365.00	...	...	5,200	360	1 1/4 x 1-7/16	630	1/2	Freon	1/100	1,120	300	...	...	...	42 1/2 x 26 1/4 x 19 3/4
SC-75	525.00	...	...	8,100	450	1 1/4 x 2 1/2	450	1	Freon	1/30	640-800	300-400	...	...	...	42 1/2 x 30 x 23 3/4
SC-40	\$425.00	...	...	4,680	400	1 1/4 x 1-7/16	630	1/2	Freon	1/100	1,120	230	...	...	...	42 1/2 x 28 3/4 x 19 3/4
SC-80	584.00	...	...	7,290	550	1 1/4 x 2 1/2	450	3/4	Freon	1/30	800	230	...	...	...	42 1/2 x 30 1/2 x 23 3/4
SCV-66	631.00	...	...	7,400	600	1 1/4 x 2 1/2	410	1	Freon	1/30	640-800	300-400	...	...	...	30 1/2 x 62 x 20 1/2
SCVH-66	697.00	...	...	7,400	640	1 1/4 x 2 1/2	410	1	Freon	1/30	640-800	300-400	...	7,500	3.2	30 1/2 x 62 x 20 1/2
<b>Floor Type</b>																
RV-66	\$435.50	...	2,350	5,150	7,400	325	...	...	Freon	1/30	640-800	300-400	...	...	...	30 1/2 x 62 x 20 1/2
RVH-66	503.00	...	2,350	5,150	7,400	365	...	...	Freon	1/30	640-800	300-400	...	...	...	30 1/2 x 62 x 20 1/2
H-3	250.50	...	4,440	6,660	11,100	200	...	...	Freon	1/20	1,150	400	...	...	...	31 1/2 x 39 1/4 x 14
H-4	307.00	...	4,440	6,660	11,100	244	...	...	Freon	1/20	1,150	400	...	21,200	2.6	31 1/2 x 39 1/4 x 14
V-3	192.00	...	3,960	5,940	9,900	231	...	...	Freon	1/20	1,150	340	...	...	...	43 3/4 x 28 3/4 x 14
V-4	299.50	...	3,960	5,940	9,900	261	...	...	Freon	1/20	1,150	340	...	21,200	7.0	43 3/4 x 28 3/4 x 14
R-100	\$236.00	...	3,300	10,100	13,400	...	...	...	Freon	1/16	875-1,060	400-475	...	...	...	30 x 36 x 16 1/2
<b>Suspended Type</b>																
S-3	\$230.50	...	2,970	10,515	13,485	148	...	...	Freon	1/20	1,150	775	...	...	...	22 x 24 x 20 1/2
SU-34	...	...	9,300	24,900	34,200	298	...	...	Freon	1/2	830	1,500	...	...	...	16 1/4 x 51 1/2 x 42 1/2
SUH-34	...	...	9,300	24,900	34,200	365	...	...	Freon	1/2	830	1,500	40,000	...	...	16 1/4 x 51 1/2 x 48
SUD-34	...	...	9,300	24,900	34,200	378	...	...	Freon	1/2	830	1,500	...	...	...	16 1/4 x 51 1/2 x 48
S-150	254.00	...	7,100	12,500	19,600	132	...	...	Freon	1/20	800	700	...	...	...	23 x 18 1/4 x 22 1/2

## Kelvinator

Kelvinator Corp., Detroit, Mich.

**Functions**—Self-contained type: cooling, dehumidifying, and cleaning, with heating and humidifying optional on all but model SC-55-DU. Remote floor type: cooling, dehumidifying, and cleaning, with heating and humidifying optional on all but model FT-55-DU. Suspended type: cooling, dehumidifying, and cleaning, with heating and humidifying optional on all but models C-70-DU, C-125-DU,

C-200-DU, C-373-DU. Duct type coils: cooling and dehumidifying.

**Cabinet**—Self-contained type: lacquer finish. Remote floor type: lacquer finish. Suspended type: finished with prime coat. Duct coils: finished with prime coat.

**Compressor**—Two-cylinder Kelvinator compressor, driven by repulsion-induction type motor. Pressure compressor control. High side safety cut-out.

**Blower**—Twin centrifugal type, direct motor driven for all self-con-

tained, floor type, and "C" type suspended units. All "CA" type suspended units have belt-driven twin centrifugal fans. Three-speed fan motor for all direct-driven blowers except SC-55-DU and FT-55-DU. "CA" suspended type units have single-speed fan motors.

**Air Circulation**—Self-contained and remote floor type units: air intake in two ends, air discharge in top. Multi-vane inlet and discharge grilles. Suspended type: air intake in top, air discharge in front, twin multi-vane discharge grilles. Outside air intake connection can be installed at inlet.

**Cooling Systems**—Kelvinator copper down-draft cooling coils. Cold water can be used instead of a direct expansion refrigerant in all but models of the self-contained type.

**Heating System**—Kelvinator copper heating coils.

**Type of Humidifier**—Spray type.

**Air Cleaning Medium**—Glass wool filter.

**Controls**—Self-contained type:

models SC-50-DC, SC-75-DC, and SC-100-DC have high side float valve, thermostat, humidistat, liquid line solenoid valve, air by-pass dampers, and water regulating valve. Other models have all these but humidistat and air by-pass dampers. Remote floor type: All models have thermostatic expansion valve and models FT-50-DC, FT-75-DC, and FT-100-DC have air by-pass dampers. Suspended type: all models have thermostatic expansion valve and models CA-275-DC, CA-400-DC, CA-500-DC, and CA-600-DC have air by-pass dampers.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity* —	Dehumidification	Sensible Heat	Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity R.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
Self-Contained																			
SC-55-DU	.....	...	...	1,700	4,800	6,500	580	1½ x 1¼	575	½	Freon	1/40	960	...	240	525	.....	...	49 x 34¼ x 17¼
SC-80-DU	.....	...	...	2,900	6,800	9,700	630	1-11/16 x 2	575	¾	Freon	1/40	1,140	...	275	600	7,400	†	53 x 34¼ x 17¼
SC-110-DU	.....	...	...	4,200	10,000	14,200	750	2¼ x 2½	375	1	Freon	1/20	1,140	...	390	600	19,400	†	55¼ x 42¾ x 19¼
SC-160-DU	.....	...	...	5,400	12,800	18,200	875	2¼ x 2½	490	1½	Freon	1/10	1,140	...	535	735	24,000	†	58 x 42¼ x 19¼
SC-50-DC	.....	...	...	1,400	5,700	7,100	630	1½ x 1¼	575	½	Freon	1/40	1,140	...	275	600	7,400	†	53 x 34¼ x 19¼
SC-75-DC	.....	...	...	1,700	8,300	10,000	750	1-13/16 x 2½	375	¾	Freon	1/20	1,140	...	390	600	19,400	†	55¼ x 42¾ x 19¼
SC-100-DC	.....	...	...	3,700	11,400	15,100	850	2¼ x 2½	375	1	Freon	1/10	1,140	...	535	735	24,000	†	58 x 42¾ x 19¼
Remote Floor Type																			
FT-55-DU	.....	...	...	2,600	5,000	7,600	225	.....	.....	.....	Freon	1/40	960	...	240	525	.....	...	27½ x 14½ x 34¼
FT-80-DU	.....	...	...	3,900	6,900	10,800	280	.....	.....	.....	Freon	1/40	1,140	...	275	600	7,400	†	31¾ x 14½ x 34¼
FT-110-DU	.....	...	...	5,300	9,700	15,000	325	.....	.....	.....	Freon	1/20	1,140	...	390	600	19,400	†	31¾ x 14½ x 42¾
FT-160-DU	.....	...	...	6,900	13,000	19,900	365	.....	.....	.....	Freon	1/10	1,140	...	535	735	24,000	†	34½ x 17 x 42¾
FT-50-DC	.....	...	...	2,400	5,700	8,100	295	.....	.....	.....	Freon	1/40	1,140	...	275	600	7,400	†	31¾ x 14½ x 34¼
FT-75-DC	.....	...	...	3,100	8,200	11,300	350	.....	.....	.....	Freon	1/20	1,140	...	390	600	19,400	†	31¾ x 14½ x 42¾
FT-100-DC	.....	...	...	4,200	10,800	15,000	375	.....	.....	.....	Freon	1/10	1,140	...	535	735	24,000	†	34½ x 17 x 42¾
Suspended Type																			
C-70-DU	.....	...	...	3,300	6,400	9,700	175	.....	.....	.....	Freon	1/40	1,140	...	265	630	.....	...	15¾ x 30¾ x 17¾
C-125-DU	.....	...	...	6,900	11,200	18,100	215	.....	.....	.....	Freon	1/20	1,140	...	390	860	.....	...	19¾ x 31½ x 22
C-200-DU	.....	...	...	12,200	19,600	31,800	375	.....	.....	.....	Freon	1/10	1,140	...	650	753	.....	...	19¾ x 46¼ x 22
C-375-DU	.....	...	...	25,800	40,600	66,400	450	.....	.....	.....	Freon	¾	1,140	...	1,400	950	.....	...	22¾ x 46¼ x 33
CA-400-DU	.....	...	...	23,000	36,800	59,800	590	.....	.....	.....	Freon	½	1,725	...	1,200	1,435	110,000	†	26¾ x 46¼ x 52½
CA-550-DU	.....	...	...	28,800	47,200	76,000	620	.....	.....	.....	Freon	½	1,725	...	1,820	1,655	146,000	†	26¾ x 46¼ x 53¾
CA-600-DU	.....	...	...	35,500	57,000	92,500	820	.....	.....	.....	Freon	½	1,725	...	1,820	1,655	161,000	†	30¾ x 50¼ x 65¼
CA-900-DU	.....	...	...	43,500	74,900	118,400	835	.....	.....	.....	Freon	½	1,725	...	2,800	1,475	216,000	†	30¾ x 50¼ x 65¼
CA-275-DC	.....	...	...	17,100	31,700	48,800	610	.....	.....	.....	Freon	½	1,725	...	1,200	1,435	110,000	†	26¾ x 46¼ x 52½
CA-400-DC	.....	...	...	22,400	44,900	67,300	620	.....	.....	.....	Freon	½	1,725	...	1,820	1,655	146,000	†	26¾ x 46¼ x 53¾
CA-500-DC	.....	...	...	26,500	49,200	75,700	820	.....	.....	.....	Freon	½	1,725	...	1,820	1,655	161,000	†	30¾ x 50¼ x 65¼
CA-600-DC	.....	...	...	34,700	69,700	104,400	835	.....	.....	.....	Freon	½	1,725	...	2,800	1,475	216,000	†	30¾ x 50¼ x 65¼
Duct Type																			
DSD-611	.....	.74	...	4,380	8,300	12,680	35	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	25¾ x 7 x 10¾
DSD-617	.....	1.19	...	7,050	13,100	20,150	55	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	25¾ x 9¾ x 14
DSD-821	.....	1.19	...	10,200	15,300	25,500	65	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	25¾ x 9¾ x 14
DSD-624	.....	1.68	...	9,950	18,500	28,450	75	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	34¾ x 9¾ x 14
DSD-829	.....	1.68	...	13,900	21,800	35,700	95	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	34¾ x 9¾ x 14
DSD-630	.....	2.06	...	12,200	22,700	34,900	90	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	26¾ x 16 x 14¾
DSD-836	.....	2.06	...	17,100	26,700	43,800	110	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	26¾ x 16 x 14¾
DSD-642	.....	2.92	...	17,200	32,100	49,300	130	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	35¼ x 16 x 14¾
DSD-851	.....	2.92	...	24,100	37,900	62,000	160	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	35¼ x 16 x 14¾
DSD-652	.....	3.64	...	21,400	40,000	61,400	155	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	42¼ x 16 x 14¾
DSD-863	.....	3.64	...	30,000	47,000	77,000	195	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	42¼ x 16 x 14¾
DSD-664	.....	4.52	...	26,700	49,800	76,500	200	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	35¼ x 24 x 14¾
DSD-879	.....	4.52	...	37,300	58,700	96,000	250	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	35¼ x 24 x 14¾
DSD-680	.....	5.63	...	33,300	63,500	96,800	250	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	42¼ x 24 x 14¾
DSD-8100	.....	5.63	...	46,700	73,300	120,000	310	.....	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	42¼ x 24 x 14¾



## Donovan Traces Selling Steps In Air-Conditioning Field

By J. J. Donovan, Manager, Air-Conditioning Dept., General Electric Co.

ABOUT four years ago, the great electric power industry, a number of manufacturers, and a part of the public really began to recognize air conditioning as a service that could well be regarded as the basis for a new industry. Much research had already been done, and various forms of air conditioning had been in use for a number of years, but these applications were of a highly specialized nature, and neither their existence nor their benefits were widely understood or appreciated.

With the advent of air conditioning in public places, such as theaters, large department stores, and railroads, its real scope and possibilities began to be apparent, and it took its place in the public press, and in the public mind, as our next great industry.

Undoubtedly, our economic situation had much to do with this, since nearly everyone was looking about for some new product that would render a valuable service to its purchaser, have a wide acceptance, and thus, use men and materials in such large quantities as to help materially, to lift us out of the slough of economic despond into which we had fallen.

### Predictions Justified

Looking over what has happened in air conditioning during the last four years, it can be said that air conditioning as an industry has not done all of these things as yet, but results so far, and the situation today, are such as to justify the most sanguine predictions that have been made.

Nearly everyone wants to know where the industry stands today; where it is going; what are the problems that must be met now and in the future, and how best to meet those problems. In order to answer these questions as simply and as directly as I can, to the best of my ability, for the purpose of this paper, I shall break down air-conditioning service into two parts—

1. Summer air conditioning.
2. Winter air conditioning.

A winter air-conditioning system is one which heats, humidifies, circulates, and purifies the air, and a summer air-conditioning system is one which cools, dehumidifies, circulates, and purifies the air. The combination of apparatus performing all these functions is called a year-round air-conditioning system.

### Market Classifications

The market for air-conditioning applications can be divided roughly into three classifications—the industrial, commercial, and residential—with the applications being based, in the order named, on necessity, profit, and comfort, and health.

In the industrial field, or the field in which air conditioning was first used, the control of temperature and humidity in certain manufacturing processes is so important as to make it a necessity under present day standards. While this application is the oldest, it does not mean that the industry has developed this market to anywhere near the fullest extent. While considerable application, research, and sales work will always have to be carried on in the industrial field, it can be said that there, air conditioning has definitely arrived.

### 'Profit' Market

By air conditioning for profit, I refer to installations made in theaters, restaurants, department stores, specialty shops, etc., where the added comfort offered to customers has a very definite and favorable effect upon patronage and business. The rapidity

with which air-conditioning installations have been—and are being—made in this type of market, clearly indicates that in this field, also, air conditioning has arrived.

Executives in these various lines are free to state that, in their opinion, no merchandising institution catering to the public, not having air conditioning, can survive the competition of others having air conditioning. This means that every theater, restaurant, specialty shop, beauty parlor, etc., right down to the cheapest class, must soon install air conditioning. In that field, competition among retailers for the consumer's favor and dollar gives air conditioning an impetus that is very desirable, indeed.

Considerable sales work will always have to be done to broaden the market to the limits of its possibilities in the shortest time possible, but it can be said with all certainty, that in this field also, air conditioning has arrived, and justified itself, economically.

### Retailers Worry About Growth

In connection with this last, it has been said that if all retail establishments were air conditioned, the advantage that now accrues to the air-conditioned store, because of the competitive situation, would be lost, and that it would then become more or less of a financial burden.

Far-seeing authorities in the retailing field, disagree with this. In the case of department stores and apparel stores of all sorts, for many years a very appreciable and expensive summer slump was experienced, not because the articles offered for sale were not needed and wanted, but because the average person did not wish to undergo the discomfort attendant to their purchase.

It is felt that, as soon as all stores are air conditioned, women will look forward with pleasure, to a day of shopping—and retail sales, generally, will increase.

For example: a certain department store, with which I am familiar, that was air conditioned last year, experienced a 35 per cent increase in the business of their shoe department, during July, as compared to the year previous.

### Brings Added Business

The management of this store does not believe that this increase was due to their taking business away from other stores. They believe—and an examination of their records indicates this—that the additional sales were made largely to their own customers, who were willing to stop and buy in an air-conditioned room, whereas previously, their desire of ownership was not sufficient to overcome the inconvenience and discomfort that they had had to contend with.

It is a definite fact that sales in air-conditioned restaurants increase not only in total dollar volume, and in number of customers served, but also, in the size of the individual customer's check.

In women's specialty shops, the elimination of spoilage loss, by itself, is more than sufficient, usually, to justify an air-conditioning installation.

I mention these things, in order to point out that in the commercial field, air conditioning is here, its status is healthy, and its growth is assured.

The third broad classification of markets is the residential market. In this, I include the installation of air conditioning in offices, as well as in homes.

It is true that there undoubtedly is a very definite profit factor in the office field, but due to increased efficiency and productivity of workers.

However, since there is not yet available, enough data to translate these results into dollars and cents, for the purpose of this paper, office installations are classed as being made for comfort and health, or for the same reasons that apply in the home market.

### Least Progress in Residential Field

In the residential field, air conditioning has made the least progress. It is there that the industry faces its biggest promotional sales problem at this time.

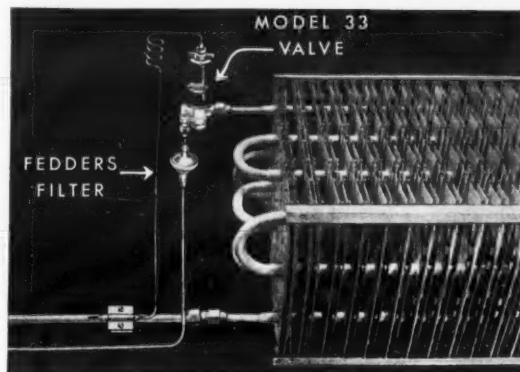
Installations are being made in increasing numbers in offices, and there is no question but that, when the facts with regard to the benefits of these installations are made available, the profit factor of air conditioning for offices will be so obvious that this type of installation can be moved out of the residential classification, over to the commercial group, where air conditioning is done for profit.

In the strictly residential field, air conditioning for winter has a much wider acceptance than air conditioning for summer. This is undoubtedly due to the fact that in nearly all sections of this country, provision must be made for some type of heating, and the change to equipment providing proper temperature, humidity, (Continued on Page 21, Column 1)

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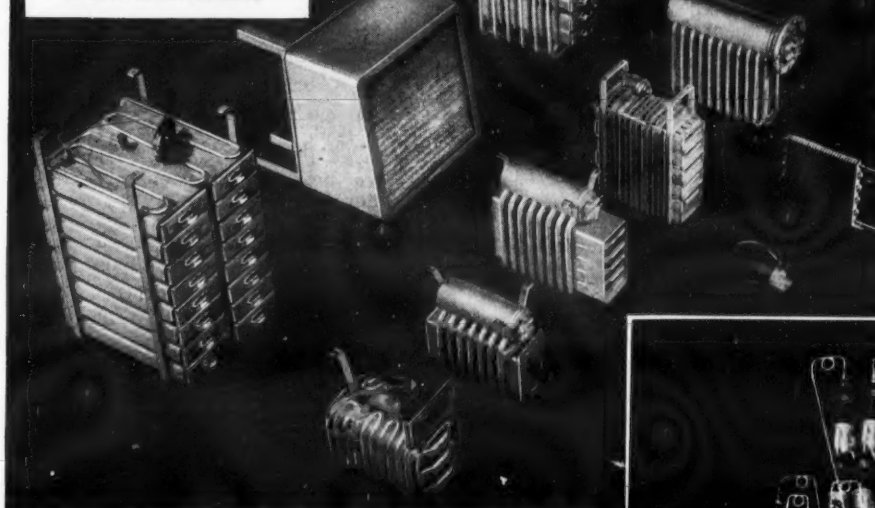
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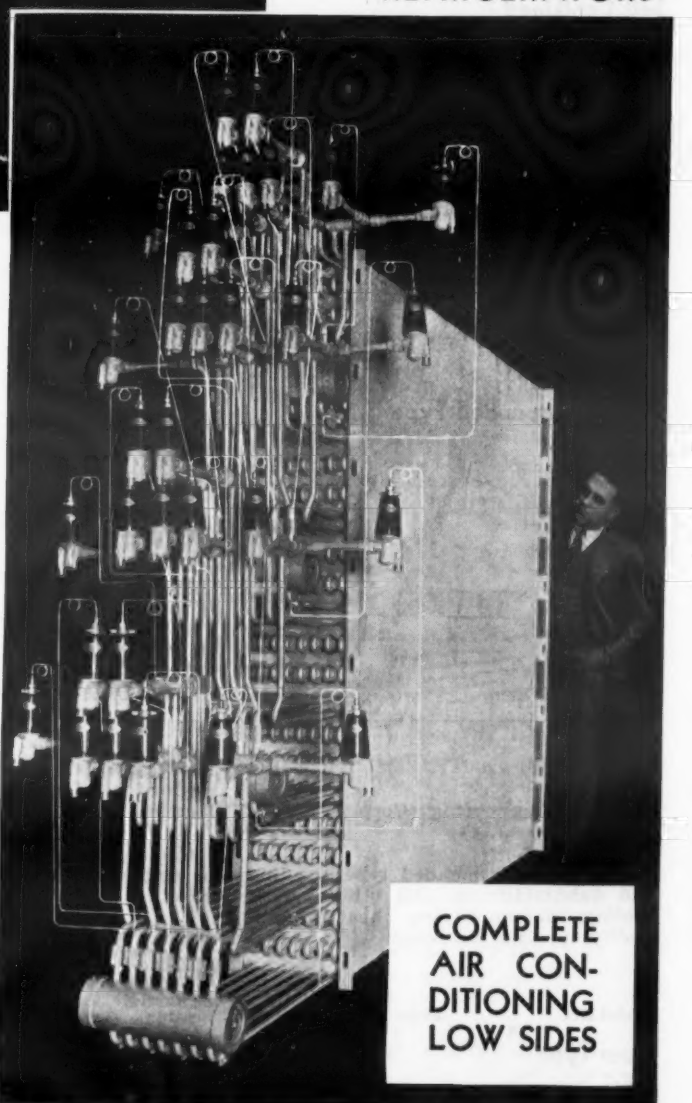
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## General Electric

General Electric Co.  
New York, N. Y.

**Functions**—Self-contained type: model FR-1—cooling, dehumidifying, heating, humidifying, cleaning, and ventilating; model FC-1—cooling and dehumidifying. Remote floor type: models AD-3 and AD-4—cooling, dehumidifying, heating, humidifying, cleaning, and ventilating; models AG-1 and AG-2—cooling and dehumidifying. Suspended type: cooling and dehumidifying. Duct type: cooling, dehumidifying, heating, humidifying, cleaning, and ventilating.

**Cabinet**—Self-contained type and remote type: G-E cabinet with walnut

finish. Suspended type: gray finish for all but model AG-4, which has a walnut finish. Duct type: G-E cabinet with gray finish.

**Compressor**—G-E 2-cylinder compressor. Compressor charge: model FR-1, 5½ lbs.; model FC-1, 3½ lbs. Across the line magnetic motor starter. Condenser pressure high side safety cut-out. Pressure control.

**Blower**—Self-contained type: model FR-1, two double-inlet multivane, with a.c. capacitor or d.c. tapped series motor; model FC-1, G-E propeller type with a.c. shaded poles or d.c. shunt series motor. Remote floor type: model AD-3, two double-inlet multivane; model AD-4, four double-inlet multivane; others, propeller type; blower motor—AD models a.c. capaci-

tor or d.c. tapped series; AG models a.c. resistance split-phase or d.c. compound. Suspended type: propeller-type blower, with a.c. resistance split-phase or d.c. compound blower motor. Duct type: models AA-3 and AA-4—double-inlet and multivane blower, with split-phase motor; HC series—Centrifugal blower mounted internally or externally with V-belt drive. Propeller direct-connected fans optional on HC-1 and HC-2.

**Air Circulation**—Self-contained type: air intake in end, air discharge in model FR-1 in front, model FC-1 in top; model FR-1 has a G-E louvred grille, model FC-1 a fin-and-bar type grille. Remote floor type: air intake, model AD-3, right end, others, both ends; air discharge, models AD-3 and AD-4, front, others, top. Models AD-3

and AD-4 have G-E louvred grilles, others have G-E turning vane grilles. Suspended type: air intake, model AG-4, ends, others, rear; air discharge, front. Model AG-4 has the G-E turning vane grille, all others have G-E fan guard grille. Duct type: AA-3 and AA-4—air intake, side near bottom; discharge, side near top; HC series—air intake, end; air discharge, opposite end. Fresh air intake provided on models FR-1, AD-3, AD-4, and optional on all other remote floor type, suspended type, and duct type units.

**Cooling System**—Self-contained type: direct expansion only. Other types, direct expansion or circulating cold water. Copper cooling coils.

**Heating System**—Copper heating coils.

**Type of Humidifier**—Self-contained and remote floor type: open pan. Duct type: extended surface.

**Air Cleaning Medium**—Dry "adhesive impingement" type.

**Controls**—Self-contained type: thermostatic expansion valve and water regulating valve. Thermostat and humidistat optional on model FR-1. Remote floor type: thermostatic expansion valve, with thermostat, humidistat and liquid line solenoid valve optional. Suspended type: thermostatic expansion valve, with thermostat and liquid line solenoid valve optional. Duct type: AA-3 and AA-4—thermostatic expansion valve, humidistat, and thermostat. Liquid line solenoid valve optional. HC series—depend on application.

Model No.	Price	Surfaces Cool	Sq. Ft. Heat	—Refrigeration Capacity— Dehumid- Sensible Heat Total			Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrig- erant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidi- fication Lbs./hr.	Overall Dimensions	
Self-Contained Type																				
FR-1 .....	\$625.00	46	15	3,200	5,150	8,350	576	2 x 2½	390	1	Freon	1/60	820	6	200	....	11,500	1.8	39¼ x 63	x 14¾
FC-1 .....	400.00	29.8	...	1,850	2,870	4,720	368	2 x 1½	400	½	Freon	....	1,400	7	200	....	.....	...	37¼ x 40½	x 13¾
Floor Type																				
AD-3 .....	\$295.00	46	15	2,220	3,710	5,930	213	.....	....	...	Freon or cold water	1/60	820	6	200	....	11,500	1.8	39¼ x 36½	x 14¾
AD-4 .....	385.00	78	29.2	4,340	8,180	12,520	298	.....	....	...	Freon or cold water	1/30	820	6	450	....	21,000	3.0	39¼ x 50½	x 14¾
AG-1 .....	175.00	40	...	2,290	3,880	6,170	81	.....	....	...	Freon or cold water	1/100	900	10	535	....	.....	...	31½ x 31	x 17½
AG-2 .....	200.00	80	...	4,590	7,770	12,360	98	.....	....	...	Freon or cold water	1/100	900	10	535	....	.....	...	31½ x 31	x 17½
Suspended Type																				
AG-4 .....	\$195.00	80	...	4,590	7,770	12,360	99	.....	....	...	Freon or cold water	1/100	800 900 860	10	475 535	....	.....	...	24½ x 29½	x 16¾
AG-12 .....	320.00	122	...	9,270	15,830	25,100	197	.....	....	...	Freon or cold water	1/20	930 860	14	1,200	....	.....	...	22 x 38	x 24
AG-14 .....	370.00	276	...	11,520	19,780	31,330	200	.....	....	...	Freon or cold water	1/20	930	14	1,200	....	.....	...	22 x 38	x 24
Duct Type																				
AA-3 .....	\$620.00	231	185	13,800	23,800	37,600	508	.....	....	...	Freon or cold water	¾*	635 555 510	12¼	1,600 1,400 1,200	....	130,000 115,000 100,000	12.5	81¾ x 48¼	x 28¾
AA-4 .....	\$1,085.00	462	370	27,600	47,600	75,200	919	.....	....	...	Freon or cold water	¾ ¾ ¾	630 550 510	12¼	3,200 2,800 2,400	....	260,000 230,000 200,000	25.0	81¾ x 48¼	x 55¾
HC series ...	.....	...	...	.....	.....	33,000 to 464,000	...	.....	....	...	Freon or cold water	.....	.....	.....	1,200 to 9,600	....	41,000 to 641,000	20 to 116	.....	.....

\*½ (60 cycles) ¾ (50 cycles and 25 cycles).

## Westinghouse

Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.

**Functions**—Models SW05, ES05, and ES10: cooling and dehumidifying; models EH10, EL10, ES20, ES24, ES40, ES44, ES60, ES64, EL14, and EH14: cooling, dehumidifying, and cleaning; models EH12, EL12, ES22, ES25, ES42, ES45, ES62, ES65, EL15, and EH15:

cooling, dehumidifying, heating, humidifying, and cleaning.

**Cabinet**—All suspended and duct types except models ES05 and ES10 have a Westinghouse-made cabinet finished in brown with aluminum trim. Models ES05 and ES10 have a mahogany finished cabinet. Self-contained and floor-type models have a mahogany or walnut finished cabinet of modern style.

**Compressor**—All models which have a compressor use a 2-cylinder unit, except model SW05, which has four cylinders. Westinghouse motors and motor starters are used. All models are equipped with high side safety cut-out.

**Air Circulation**—Self-contained cabinet type, air intake in left end, discharge in top; remote floor type, intake both ends, discharge, top; all others, intake, rear, discharge, front.

**Blower**—Self-contained and remote-type floor conditioners and models ES05 and ES10: Westinghouse screw type with direct drive; others, centrifugal type with belt drive. Westinghouse blower motor.

**Type of Humidifier**—Target spray.

**Cooling System**—Models ES24, ES25, ES44, ES45, ES64, and ES65: cold water; others: direct expansion. Copper cooling coils.

**Controls**—All models for Freon provided with thermostatically controlled expansion valve. All models providing humidification are provided with water pressure gauge, strainer, magnet valve, and pressure reducing valve.

**Air Cleaning Medium**—Filter.

**Heating System**—Copper heating coils. All heating coils adaptable for hot water systems.

Model No.	Price	Surfaces Cool	Sq. Ft. Heat	—Refrigeration Capacity—			Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor		Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidi- fication Lbs./hr.	Overall Dimensions
				Dehumidi- fication	Sensible Heat	Total				Hp.	Refrig- erant								
Self Contained																			
SW05	\$.....	...	...	2,330	4,700	7,030	345	.....	1,750	½†	Freon	1/125	925	10¼	225	....	.....	...	26½ x 38¾ x 13½
Floor Type																			
EH10	\$.....	...	...	2,820	8,805	11,625	215	1¼ x 1¾	1,150	1½	Freon	1/60†	925	10¼	450	....	.....	...	40 x 38¾ x 13½
EL10	.....	...	...	2,820	8,805	11,625	180	1¼ x 1¾	1,150	1½	Freon	1/60†	925	10¼	450	....	.....	...	26½ x 38¾ x 13½
EH12	.....	...	...	2,820	8,805	11,625	255	1¼ x 1¾	1,150	1½	Freon	1/60†	925	10¼	450	....	25,000	3½	40 x 38¾ x 13½
EL12	.....	...	...	2,820	8,805	11,625	220	1¼ x 1¾	1,150	1½	Freon	1/60†	925	10¼	450	....	25,000	3½	26½ x 38¾ x 13½
EH14	.....	...	...	3,500	8,650	12,150	205	.....	.....	...	*Water	1/60†	925	10¼	450	....	.....	...	40 x 38¾ x 13½
EL14	.....	...	...	3,500	8,650	12,150	170	.....	.....	...	*Water	1/60†	925	10¼	450	....	.....	...	26½ x 38¾ x 13½
EH15	.....	...	...	3,500	8,650	12,150	245	.....	.....	...	*Water	1/60†	925	10¼	450	....	25,000	3½	40 x 38¾ x 13½
EL15	.....	...	...	3,500	8,650	12,150	210	.....	.....	...	*Water	1/60†	925	10¼	450	....	25,000	3½	26½ x 38¾ x 13½
*Water or brine.																			
Suspended Type																			
ES05	\$.....	...	...	1,400	4,325	5,725	90	.....	.....	...	Freon	1/125	925	10¼	225	....	.....	...	16½ x 18½ x 13½
ES10	.....	...	...	2,800	8,650	11,450	130	1¼ x 1¾	1,150	1½	Freon	1/60	925	12	485	....	.....	...	21¾ x 23¾ x 14
Duct & Suspended Type																			
ES20	\$.....	...	...	6,000	19,800	25,800	480	2½ x 1¾	1,150	3	Freon	¾	1000-1200	9¾	900	....	.....	...	21 x 32½ x 48
ES22	.....	...	...	6,000	19,800	25,800	585	2½ x 1¾	1,150	3	Freon	¾	1000-1200	9¾	900	....	52,000	3½	21 x 32½ x 48
ES24	.....	...	...	11,000*	16,500	27,500	460	.....	.....	...	†Water	¾	1000-1200	9¾	900	....	.....	...	21 x 32½ x 48
ES25	.....	...	...	11,000*	16,500	27,500	565	.....	.....	...	†Water	¾	1000-1200	9¾	900	....	52,000	3½	21 x 32½ x 48
ES40	.....	...	...	12,000	39,600	51,600	790	3 x 3	875	7½	Freon	¾	1000-1200	9¾	1,800	....	.....	...	21 x 54½ x 48
ES42	.....	...	...	12,000	39,600	51,600	920	3 x 3	875	7½	Freon	¾	1000-1200	9¾	1,800	....	106,500	7	21 x 54½ x 48
ES44	.....	...	...	22,000*	33,000	55,000	750	.....	.....	...	†Water	¾	1000-1200	9¾	1,800	....	.....	...	21 x 54½ x 48
ES45	.....	...	...	22,000*	33,000	55,000	880	.....	.....	...	†Water	¾	1000-1200	9¾	1,800	....	106,500	7	21 x 54½ x 48
ES60	.....	...	...	16,650	54,950	71,600	900	3 x 3	1,150	10	Freon	¾	1000-1200	9¾	2,700	....	.....	...	21 x 65¼ x 48
ES62	.....	...	...	16,650	54,950	71,600	1,090	3 x 3	1,150	10	Freon	¾	1000-1200	9¾	2,700	....	161,000	10½	21 x 65¼ x 48
ES64	.....	...	...	33,000*	49,500	82,500	840	.....	.....	...	†Water	¾	1000-1200	9¾	2,700	....	.....	...	21 x 65¼ x 48
ES65	.....	...	...	33,000*	49,500	82,500	1,030	.....	.....	...	†Water	¾	1000-1200	9¾	2,700	....	161,000	10½	21 x 65¼ x 48
*Water or brine. †Two ¼-hp. motors. ‡Two 1/125-hp. motors.																			

\*Water or brine. †Two ¼-hp. motors. ‡Two 1/125-hp. motors.

## Carrier

Carrier Engineering Corp.  
Newark, N. J.

**Functions**—Suspended type: cooling and dehumidifying. All other types: cooling, dehumidifying, heating, humidifying, and cleaning.

**Cabinet**—Steel cabinet. Remote floor type and suspended type have grained walnut finish; duct type, lacquer.

**Cooling System**—Direct expansion or cold water. Aerofin copper cooling coils.

**Blower**—Suspended type has Carrier

disc fan, all other types have Carrier centrifugal blower. Remote floor type and suspended type are direct driven, duct type blowers are belt driven.

**Air Circulation**—Air intake on rear and discharge in front on suspended-type model. Inake in base and discharge in top on other types. Fresh air intake provided on all but sus-

pended-type conditioner. Remote floor type has a fixed grille, suspended type an adjustable grille, while on duct type it is optional.

**Air Cleaning Medium**—Filter.

**Controls**—Suspended type: thermostatic expansion valve, thermostat and liquid line solenoid valve. Other types:

thermostatic expansion valve, thermostat, humidistat, and liquid line solenoid valve.

**Heating System**—Same coils used as for cooling, with hot water.

**Type of Humidifier**—Remote floor type: target spray. Duct type: pan.

Model No.	Price	Surfaces Cool	Sq. Ft. Heat	—Refrigeration Capacity—			Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refriger- ant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidi- fication Lbs./hr.	Overall Dimensions
				Dehumidi- fication	Sensible Heat	Total													
Floor Type																			
48F-2	\$.....	...	...	4,700	10,800	15,500	175	.....	....	...	*CH <sub>3</sub> Cl	1/30	870	6½	450	....	25,000	2.7	24 x 42½ x 12½
*Freon optional.																			
Suspended Type																			
39D	\$.....	...	...	7,200	15,000	22,200	185	.....	....	...	*CH <sub>3</sub> Cl	1/15	870	16	725	....	.....	...	22 x 22½ x 21½
*Freon optional.																			
Duct Type																			
39L M1	\$.....	...	...	11,900	25,400	37,300	650	.....	....	...	*CH <sub>3</sub> Cl	¾- ¾	715-1,140	12	500-1,000	....	74,600	3.7	75 x 31 x 26
39L M2	.....	...	...	23,800	50,800	74,600	900	.....	....	...	*CH <sub>3</sub> Cl	¾- ¾	715-1,140	12	1,000-2,000	....	149,200	7.4	75 x 51 x 26
39L M6	.....	...	...	47,600	101,600	149,200	1,650	.....	....	...	*CH <sub>3</sub> Cl	1 -1½	530- 765	16	2,000-4,000	....	298,400	7.4	76 x 63 x 49
39L M7	.....	...	...	71,400	152,400	223,800	2,300	.....	....	...	*CH <sub>3</sub> Cl	1½-2	530- 765	16	4,000-6,000	....	447,600	11.2	76 x 89 x 49
*Freon optional.																			



## Donovan Says Selling Of Air Conditioning Is Step-by-Step Plan

(Concluded from Page 19, Column 2)  
air motion and air purity, has not been so great and so radical as in the case of summer air conditioning, or comfort cooling.

The acceptance of winter air conditioning is increasing rapidly, and I look forward to the time, in the reasonably near future, when no home will be built without it.

Summer cooling, using refrigerating machinery, will likewise be accepted, but at a somewhat slower rate.

There are over twelve and one-half million residences in this country, having central heating plants, that should—and will—have some, or all degrees of air-conditioning service.

What is the industry's greatest problem today? As I see it, the problem is one of education, both on the part of the public and the salesman who are selling it. More than anything else, there is the lack of trained sales people.

### 'Mass Selling' Needed

Here we have an industry that certainly needs mass selling. By mass selling, I mean selling to a market of many people—using sales organizations made up of many people. In other words, mass selling to a mass market.

At the present state of the art, however, conventional mass or specialty selling tactics cannot be directly applied. This is true because of the engineering knowledge and qualifications that a person must have in order to successfully sell in the type of markets that are now active.

For example, in an ordinary restaurant, there are usually from six to a dozen ways to lay out an air-conditioning system to do the job. Each system will vary from the other, in results and in cost. The person who is able to lay out a system that will do the job properly at the lowest cost is the one who usually makes the sale.

The matter of profit or loss on the installation is entirely in the hands of the salesman or estimator—since up to fifty, and sometimes a higher percentage of the cost to the consumer, results from the expense of labor, duct work, etc., all of which are variables, applying strictly to the particular job in question.

Even in the application of units, there are enough variables due to installation costs, that the general practice of the industry is to price each job separately.

### Standardized Prices Coming

Standardized methods of pricing are being developed insofar as possible in connection with the sale of unit type systems. This will help somewhat, as will the introduction of air-cooled, plug-in type room coolers.

All of this means that the sale of air conditioning carries with it problems that cannot be solved by conventional specialty selling procedure. We do know, however, that if the great air-conditioning market is to be approached on a broad scale, it is necessary to put large numbers of sales representatives into the field as soon as possible.

These men must be trained to the point that the recommendations that they make to the public will be right. These salesmen must have a better engineering background than is usually the case with specialty appliance salesmen. They must spend a considerably greater period of time in training.

It has always been the custom, when large numbers of salesmen are needed, to have the compensation on a commission basis; otherwise, sales expense would be higher than the industry could stand.

Having in mind the financial condition of the average salesman applying for a position, it is absolutely impera-

tive to make it possible for a new man to earn some money almost immediately after he is hired. We have felt, therefore, that our air-conditioning program should be adjusted to two things:

First—The situation as applying to salesmen.

Second—The status of the market.

### Program Fitted to Sales Training

The products that are in our line of air-conditioning equipment today, are being offered not alone with regard to their service and value to the customer, but also, as to how they fit in to a program of developing a large number of salesmen to the point that they are competent to cope with the technical, as well as the sales problems in the air conditioning field.

Realizing that automatic heat is one of the most important and widely accepted parts of complete air-conditioning service, and realizing also, that there had been a certain amount of standardization in sales procedure in this field, our first product was the General Electric oil furnace. This was supplemented later, with our gas furnace.

The new salesmen selected were of as high a type, and had the best background that was possible to secure. They were given a short, intensive training, so that, backed up by a fairly intensive advertising sales promotion campaign and help received from their supervisor and sales manager, qualified men were able to secure an income in a very short time.

We next brought out a device which we called, our conditioner for winter. This provides three of the factors of winter air conditioning, i.e., humidity, air circulation, and air cleaning.

As the next step, the men were taught to sell this product.

Then, we brought out our air-conditioning system, which, when used in connection with our oil or gas furnace, supplied complete winter air conditioning through a duct-work distribution system. The layout and sale of this product required considerable engineering ability, and naturally, not all of the men who could sell furnaces were able to qualify as salesmen.

After this, we brought out a number of products to perform some or all of the functions of summer, winter, and year-round air conditioning—each product timed so that the simpler devices were made available first. During all this period, we had under way, three types of training courses that the factory made available. One, a strictly sales course; another, a strictly engineering course; and a third, a sales engineering course which combined some of the features of both.

### Taught by Correspondence

These were correspondence courses, and the men taking them were required to send in the proper answers to each lesson before they received the material for the next.

In addition to this, a series of field training schools have constantly been conducted by our engineers in the field: all to the end that every installation would be as good as we could make it. These schools were supplemented by several factory schools for dealers' engineers.

We felt that, this season, the market for air conditioning would be so active that we undertook our most important single training program. In January, we held a one month's school in Schenectady. This school was attended by the dealers' sales engineers or the men responsible for the sale of the type of air-conditioning equipment that requires considerable engineering and fabrication in the field, or the types that are now being sold in the largest numbers. Some 225 men were in attendance at this school.

An interesting thing was that over 150 of the men present had been selling some sort of General Electric air-conditioning equipment for more than one year. In other words, the men had been brought up to the point where they could properly sell the more complicated air-conditioning job through a series of steps. Ninety-two per cent of the men who attended the school had had college training, indicating the high type of men that are attracted to the air-conditioning field.

### Market Developed by Steps

We believe, also, that the market, or acceptance for air conditioning, particularly in the residential field, will likewise be developed in steps. For example, when one has installed a winter air-conditioning system in his residence, it is a relatively simple matter to add the compressor and evaporators necessary to transform it into a complete, year-round air-conditioning system.

In conclusion, I have attempted to point out, because of the nature of air-conditioning service and the status of the market, that we have attempted to build our program, having in mind the requirements and habits of the men who sell and the people who should buy air conditioning.

We believe that all manufacturers and sales organizations should do likewise, and it will not be long before this infant, though lusty, industry grows up.

## Servel Manual Aids Salesmen Estimating Air-Conditioning Job

EVANSVILLE, Ind.—"Air Conditioning by Servel" is the new air-conditioning manual just off the presses which the commercial refrigeration division of Servel, Inc., has prepared for the use of field organizations estimating and installing air-conditioning equipment.

The manual is a primer of air conditioning, combined with the essential technical information necessary for computing the requirements for summer air conditioning of practically every class of business which can be served with Servel's line.

In preparing the manual, Servel engineers endeavored to make the technical sections as simple as possible, so that they may be used and understood by non-technical salesmen.

In the "primer" section in the first part of the manual, effective use has been made of shaded drawings to illustrate just what happens when "dehumidification," "air cooling," "humidification," other phases of air conditioning take place.

Advantages and disadvantages of various kinds of cooling methods are discussed in some detail.

In the section on "selling air conditioning" various kinds of prospects are discussed, and suggestions are made as to effective approaches on the various markets.

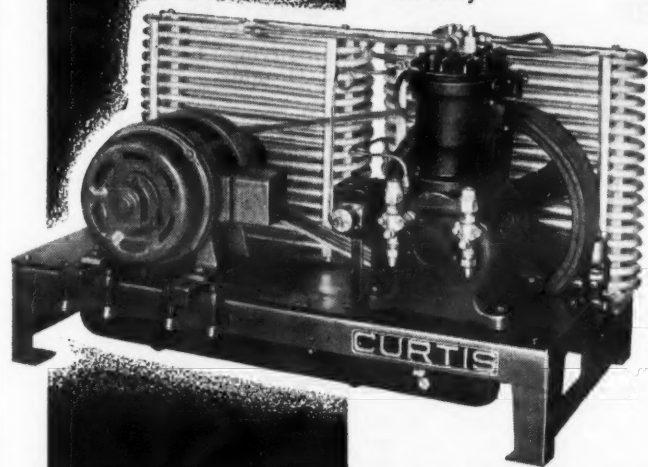
Complete data is given for calculating the summer air-conditioning load and ventilation requirements.

Of particular interest in the section giving engineering data is the series of typical layouts for specific applications, the layouts being in the form of drawings, with a listing of all the equipment, controls, and fittings necessary.

## CURTIS OFFERS

- Fair Policy—  
81 Years' Successful Merchandising
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41 Years' Building Compressors
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56 Units 1/6 to 15 H. P.
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Only by building permanently on this complete combination can you expect sure profits in this fast-growing industry.

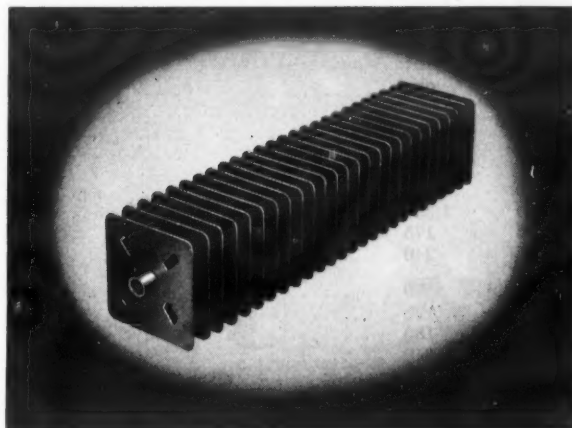


• Some desirable territories are still open for reliable distributors.

Write for details.

## CURTIS

CURTIS REFRIGERATION MACHINE CO.  
Division of Curtis Manufacturing Company  
1912 Kienlen Avenue, Saint Louis, Missouri



## BUSH INDIVIDUAL FIN COILS

FOR REFRIGERATION AND AIR CONDITIONING

IN SPECIFYING SURFACE FOR REFRIGERATION OR AIR CONDITIONING EVERY EFFORT IS MADE TO BALANCE THE LOW SIDE WITH COMPRESSOR CAPACITY. IF TOO LITTLE SURFACE IS USED LOWER COIL TEMPERATURES MUST BE RESORTED TO WITH CONSEQUENT LOWER BACK PRESSURES AND LONGER OPERATING TIME.

UNDER THE CIRCUMSTANCES IT IS WELL TO KNOW HOW SURFACE IS COMPUTED.

WE FIGURE BOTH SIDES OF EACH FIN, DEDUCT THE PIECE PUNCHED OUT FOR THE TUBE, ADD THE TUBE SURFACE AND DEDUCT THE AMOUNT OF TUBE SURFACE COVERED BY FINS.

WHEN A BUSH CATALOG STATES THAT A COIL HAS 100 SQUARE FEET OF SURFACE YOU CAN BE SURE IT ACTUALLY HAS THAT MANY SQUARE FEET OF EXPOSED SURFACE.

AS A MATTER OF FACT YOU CAN, KNOWING THE FIN SIZE AND FIN SPACING, FIGURE THE SURFACE YOURSELF AND KNOW YOU GET THE SURFACE YOU HAVE ORDERED.

THE BUSH MFG. CO.  
HARTFORD, CONN.

NEW YORK

PHILA.

DETROIT

CHICAGO





## Lipman

General Refrigeration Corp.  
Beloit, Wis.

**Functions**—Cooling and dehumidifying on all models. Heating and humidifying optional.

**Cabinet and Compressor**—4-cylinder Lipman compressor on model 5-2000 and 10-4000. Century motor with Cutler-Hammer starter and Minneapolis-Honeywell high side safety cut-out. Thermostatic compressor control. Re-

frigerant charge—10 lbs., model 5-2000, and 19 lbs., model 10-4000.

**Blower**—Buffalo HVA blower direct-driven by Wagner motor.

**Air Circulation**—Air intake in CU models in rear, discharge in front.

Intake in models 5-2000 and 10-4000 in front, discharge in rear. Fresh air intake optional. Uni-Flo grilles.

**Cooling System**—Direct expansion.

**Controls**—Thermostatic expansion valve, pressure operated water valves,

and heat interchanger on all models. Model CU2001, CU2002, CU4001, and CU4002, liquid line solenoid valves optional. Humidistats optional.

**Air Cleaning**—Filters optional.

**Surfaces**—Lipman copper cooling coils.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— At 80° DB Dehumidification	50% RH Sensible Heat	Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Duct Type</b>																		
CU2001	\$.....	...	22,000	40,000	62,000	485	.....	.....	...	Freon	1½	1,200	12	2,000	1,000	.....	.....	20 x 48½ x 31½
CU4001	.....	.....	41,000	77,000	118,000	.....	.....	.....	...	Freon	1	900	15	4,000	1,100	.....	.....	27 x 58½ x 37½
<b>Self-Contained Duct Type</b>																		
5-2000	.....	.....	22,000	40,000	62,000	1,350	2½ x 3¼	470	5	Freon	1½	1,200	12	2,000	1,000	.....	.....	45½ x 52¼ x 30¾
10-4000	.....	.....	41,000	77,000	118,000	.....	3¼ x 4	450	10	Freon	1	900	15	4,000	1,100	.....	.....	56½ x 63½ x 36½
<b>Suspended Type</b>																		
CU2002	\$.....	.....	22,000	40,000	62,000	485	.....	.....	...	Freon	1½	900	12	2,000	1,000	.....	.....	20 x 48½ x 33
CU4002	.....	.....	41,000	77,000	120,000	.....	.....	.....	...	Freon	1	750	15	4,000	1,000	.....	.....	27 x 58½ x 39½

## Buffalo Forge

Buffalo Forge Co.  
Buffalo, N. Y.

**Functions**—Remote floor-type: cooling and dehumidifying, with heating, humidifying, and cleaning optional; suspended-type: cooling and dehumidifying, with heating, humidifying,

and cleaning optional for models 254FSC, 354FSC, 454FSC, 252FSC, 352FSC, and 452FSC; duct-type: cooling, dehumidifying, heating, humidifying, and cleaning.

**Blower**—Buffalo Forge centrifugal-type blower for all models except SC series in suspended-type conditioners, which use Buffalo Forge propeller type. All blowers are direct con-

nected, except duct-type models, which are belt driven.

**Air Circulation**—Self-contained models have air intake in bottom, discharge in top; all others have air

**Cabinet**—Buffalo Forge cabinet, with galvanized finish for all but SC series in suspended-type line, which are cadmium plated.

intake at back, air discharge in front. Remote floor-type models have elbow discharge outlets, all others have fan-type outlets except SC models in the suspended type, which have louvred type.

**Controls**—Furnished as required for the specific installation.

**Cooling System**—Direct expansion

or cold water cooling in all models. Aerofin copper cooling coils.

**Heating System**—Aerofin copper heating coils. All models adaptable to hot water heating systems.

**Type of humidifier**—Pan and coil.

**Air Cleaning Medium**—Dustop filter.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— At 80° DB Dehumidification	50% RH Sensible Heat	Total	Shipping Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Duct Type</b>																		
121PC	\$.....	92	66	10,300	20,000	30,300	600	.....	.....	.....	1½	955	11½	800	800	57,000	10	21 x 27 x 82
122PC	.....	183	128	20,600	40,000	60,600	875	.....	.....	.....	1½	955	11½	1,600	800	114,000	20	21 x 47 x 82
123PC	.....	275	128	30,900	60,000	90,900	1,200	.....	.....	.....	1½	955	11½	2,400	800	155,000	30	21 x 61 x 82
152PC	.....	366	262	41,250	80,000	121,250	1,500	.....	.....	.....	1	830	15	3,200	900	228,000	40	29½ x 61 x 91
153PC	.....	549	370	62,000	120,000	182,000	1,950	.....	.....	.....	1½	830	15	4,800	900	342,000	60	29½ x 81 x 91
182PC	.....	732	394	82,500	160,000	242,500	2,500	.....	.....	.....	2	543	19	6,400	1,080	430,000	80	41½ x 72 x 113
<b>Remote Floor Type</b>																		
254FC	\$.....	257	*	21,150	63,250	84,400	925	.....	.....	.....	1	1,150	11½	2,850	1,350	.....	.....	90 x 47 x 18
354FC	.....	394	*	31,750	94,500	126,250	1,200	.....	.....	.....	1½	1,150	11½	4,280	1,350	.....	.....	90 x 68 x 18
454FC	.....	512	*	42,250	126,500	168,750	1,450	.....	.....	.....	2	1,150	11½	5,700	1,350	.....	.....	90 x 86 x 18
252FC	.....	128	*	13,700	41,400	55,100	800	.....	.....	.....	1	1,150	11½	3,240	1,500	.....	.....	90 x 47 x 18
352FC	.....	197	*	20,700	62,000	82,700	1,050	.....	.....	.....	1½	1,150	11½	4,860	1,500	.....	.....	90 x 68 x 18
452FC	.....	256	*	27,500	82,500	110,000	1,250	.....	.....	.....	2	1,150	11½	6,480	1,500	.....	.....	90 x 86 x 18
<b>Suspended Type</b>																		
254FSC	\$.....	257	*	21,150	63,250	84,400	950	.....	.....	.....	1	1,150	11½	2,850	1,350	.....	.....	18 x 47 x 46
354FSC	.....	394	*	31,750	94,500	126,250	1,250	.....	.....	.....	1½	1,150	11½	4,280	1,350	.....	.....	18 x 68 x 46
454FSC	.....	512	*	42,250	126,500	168,750	1,550	.....	.....	.....	2	1,150	11½	5,700	1,350	.....	.....	18 x 86 x 46
252FSC	.....	128	*	13,700	41,400	55,100	825	.....	.....	.....	1	1,150	11½	3,240	1,500	.....	.....	18 x 47 x 40
352FSC	.....	197	*	20,700	62,000	82,700	1,100	.....	.....	.....	1½	1,150	11½	4,860	1,500	.....	.....	18 x 68 x 40
452FSC	.....	256	*	27,500	82,500	110,000	1,350	.....	.....	.....	2	1,150	11½	6,480	1,500	.....	.....	18 x 86 x 40
413SC	.....	78	*	4,650	13,950	18,600	175	.....	.....	.....	1/20	1,750	12	700	530	.....	.....	18 x 22½ x 17
417SC	.....	95	*	6,300	18,900	25,200	240	.....	.....	.....	1/20	1,150	16	880	410	.....	.....	23¼ x 25½ x 19
419SC	.....	156	*	11,300	33,900	45,200	330	.....	.....	.....	¾	1,150	18	1,630	530	.....	.....	27 x 28½ x 19¼
213SC	.....	56	*	3,000	9,000	12,000	125	.....	.....	.....	1/20	1,750	12	820	620	.....	.....	18 x 22½ x 17
217SC	.....	69	*	4,000	12,000	16,000	180	.....	.....	.....	1/20	1,150	16	1,040	490	.....	.....	23¼ x 25½ x 19
219SC	.....	113	*	7,300	22,000	29,300	240	.....	.....	.....	¾	1,150	18	1,915	630	.....	.....	27 x 28½ x 19¼

## Thermal Units

Thermal Units Mfg. Co.  
Chicago, Ill.

**Functions**—Self-contained models: cooling, dehumidifying, and cleaning; heating and humidifying optional. Remote floor-type units: cooling, dehumidifying, and cleaning; heating and humidifying optional. Suspended type: cooling, dehumidifying, and heating; humidifying and cleaning optional.

**Cabinet**—Thermal Units cabinet. Self-contained models finished in walnut, remote floor-type cabinets in burled walnut, suspended-type models finished in aluminum.

**Compressor**—Thermal eight-cylinder compressor for models 50, 100, and 150 in self-contained series; 12-cylinder compressor for other models in self-contained series. Cutler-Hammer motor starter, Minneapolis-Honeywell high side safety cut-out.

**Blower**—Models 50, 100, and 150 of self-contained series, squirrel-cage type, belt driven; other self-contained models use a direct-driven Thermal Units blower; remote floor-type models use Torrington wheels, direct driven; suspended-type models use Thermal Units 4-blade propeller type, direct driven.

**Air Circulation**—Air intake in sides on self-contained and remote floor-type models; in rear on suspended-type

models. Air discharge in top on self-contained and remote floor-type models; in front on suspended-type models. Uni-Flo discharge grilles.

**Cooling System**—Self-contained models, direct expansion only. Others direct expansion or cold water. Thermal Units aluminum cooling coils.

**Heating System**—Thermal Units aluminum heating coils. Can be used with hot water if desired.

**Air Cleaning Medium**—Filter.

**Type of Humidifier**—Spray nozzle type.

**Controls**—Self-contained models: thermostatic expansion valve, humidistat, water regulating valve. Remote floor-type cabinets: thermostatic expansion valve, humidistat. Suspended-type: thermostatic expansion valve, humidistat, thermostat, liquid line solenoid valve.

Model No.	Price	Surfaces Sq. Ft.		—Refrigeration Capacity—			Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool	Heat	Dehumidification	Sensible Heat	Total													
Self-Contained Floor Type																			
50 .....	\$295.00	50	50	1,800	4,200	6,000	345	9/16 x 7/8	1750	1½	Freon	†	‡	7 x 3	300	450	18,000	10	35 x 31 x 15¼
100 .....	440.00	100	100	3,600	8,400	12,000	420	13/16 x 1-1/10	1150	1	Freon	†	‡	9 x 4½	400	600	36,000	15	40 x 35 x 20
150 .....	490.00	165	165	5,400	12,600	18,000	490	13/16 x 1-1/10	1750	1½	Freon	†	‡	9 x 4½	600	600	54,000	18	49 x 41 x 20
300 .....	750.00	330	330	10,800	25,200	36,000	675	15/16 x 1-3/4	1150	3	Freon	¾	‡	15	2,000	600	108,000	24	84 x 51 x 21
500 .....	1,150.00	525	525	18,000	42,000	60,000	1,025	15/16 x 1-3/4	1750	5	Freon	¾	‡	15	2,500	600	180,000	32	100 x 51 x 21
†None used. ‡Variable at will.																			
Remote Floor Type																			
5 .....	\$140.00	50	50	1800	4200	6,000	.....	.....	.....	.....	.....	1/20	‡	7 x 3	300	450	18,000	10	30 x 31 x 15¼
7 .....	160.00	75	75	2700	6300	9,000	.....	.....	.....	.....	.....	1/10	‡	9 x 4½	400	600	27,000	10	35 x 35 x 20
10 .....	175.00	100	100	3600	8400	12,000	.....	.....	.....	.....	.....	¾	‡	9 x 4½	450	600	36,000	15	44 x 41 x 20
15 .....	195.00	165	165	5400	12600	18,000	.....	.....	.....	.....	.....	¾	‡	9 x 4½	600	600	54,000	18	49 x 41 x 20
20 .....	225.00	210	210	10800	25200	24,000	.....	.....	.....	.....	.....	¾	‡	(2) 9 x 4½	750	600	72,000	18	49 x 45 x 20
30 .....	275.00	330	330	18000	42000	36,000	.....	.....	.....	.....	.....	¾	‡	(2) 9 x 4½	1,000	600	108,000	24	60 x 45 x 24
‡Variable with four speed controllers.																			
Suspended Type																			
DE12 .....	\$125.00	42	42	2592	6048	8,640	150	.....	.....	.....	.....	1/10	1,750	12	975	975	41,300	50	15 x 21¼ x 28
DE16 .....	148.00	70	70	4608	10752	15,360	215	.....	.....	.....	.....	¾	1,150	15½	1,740	1,020	73,100	70	19 x 25¼ x 31
DE20 .....	205.00	145	145	7200	16800	24,000	275	.....	.....	.....	.....	¾	1,150	19	2,710	970	136,100	190	22¼ x 29¼ x 31
DE24 .....	265.00	168	168	11472	26768	38,240	360	.....	.....	.....	.....	¾	1,150	22	4,320	1,080	195,600	190	27 x 34 x 31½
DE30 .....	340.00	245	245	15200	35200	50,400	470	.....	.....	.....	.....	½	1,150	24	5,700	980	285,300	190	33 x 37½ x 32
Capacities of above models when using cold water: model DE12, 10,800 B.t.u.'s; model DE16, 19,200; model DE20, 30,000; model DE24, 47,800; model DE30, 63,000. Water flow in gallons per minute: model DE12, 6; model LE16, 9; model DE20, 15; model DE24, 24; model DE30, 30.																			



## Ion 'Quality' of Air Is Factor In Obtaining Ideal Conditions

By Dr. S. M. Kitner, Vice President of Engineering,  
Westinghouse Electric & Mfg. Co.

MAJOR factors associated with the condition of the air for human comfort are: (1) temperature, (2) humidity, (3) cleanliness and (4) quality, which includes that mysterious invigorating something believed to be due to free ions in the air. Everybody recognizes these factors and the need of some control of them.

Why do we need to have air of a certain temperature to be comfortable? It is because nature in her processes of maintenance of the human body produces a certain amount of heat.

This heat comes from the food in process of assimilation and amounts to about 400 B.t.u.'s per hour for the average person not exercising; about the same energy as required for two 50-watt lamps.

The rate of heat development increases as one exercises and may be as much as three times as great for very violent exercise. With heat generated continuously in the body of the individual at this rate, that heat must be lost at the same rate or the body temperature will rise.

### Heat Lost in Three Ways

Heat is dissipated in three ways—first, by evaporation from perspiration and from breathing, which accounts for about 24 per cent; second, by convection currents contacting the surface of the body and clothing, amounting to approximately 30 per cent; and, third, by radiation to surrounding objects, amounting to about 46 per cent.

These proportions are for average conditions and may be varied over wide ranges, as the factors affecting any one of them is materially altered. For example, a breeze either natural or from a fan, cools by increasing both convection and the evaporation losses.

The radiation losses are not so generally understood in spite of the fact that most of our heat comes to us by radiation from the sun in the same manner that light comes from the same celestial body. Heat is radiated from one solid body to another in proportion to the difference between the fourth power of their absolute temperatures. The heat passes from the body of higher temperature to the one of lower temperature.

### Control of Radiation

The control of conditions that affect the radiation is of prime importance, as on the average most of the heat lost is by this method.

If then anything is done that increases or decreases the effectiveness of any one of these three methods of heat loss it is necessary to do something else that decreases or increases the other one or two, to compensate for this change beyond that required to secure the desired temperature balance.

For instance, if on a cold day a person comes into a warm room—they must remove the extra clothing so as to enable the same heat loss to continue in the room where the difference in temperatures between the body and the surroundings is less than it had been outdoors.

### Comfort with 80° F. Walls and 60° F. Air

Again, if means are employed to raise the temperature of the walls in a room to about 80° F. so that substantially all radiation losses are eliminated, then it is necessary to

lower the air temperature to increase the convection and evaporation losses to secure the balance. I have sat in a test room with the wall temperature at 80° F. and the average air temperature below 60° F. and felt perfectly comfortable.

The feeling of comfort is even greater than that in a room with average conditions where the air is 72° F. There is an exhilaration from the cool air that is in marked contrast to that of the 72° F. air. The effect produced by radiation can be used for securing comfort on warm days, by having cooled walls which minimize the higher temperature air effects. The temperature control is one of prime importance and one upon which much improvement in application can be expected in the future.

### Proper Humidity Important

The next factor of importance is the humidity of the air. The air can carry as a gas a certain amount of water. This amount varies with the temperature and so it is the practice to speak of the relative humidity of the air. This is expressed as a percentage and means that at the particular temperature the air has a certain percentage of the saturation value at that temperature. If the temperature is lowered the relative humidity is raised.

If it is lowered sufficiently it reaches 100 per cent when any additional lowering results in the water settling out just as is the case with the ordinary ice water pitcher, which is always covered with a heavy dew in the summer-time, when the humidity is high, or like the cooling coils of a refrigerator which always frost up, particularly on humid summer days when the air is loaded with moisture.

### Effect of Humidity

Humidity has a pronounced effect on comfort. In the summer with high humidity air the cooling due to the evaporation of perspiration is greatly reduced because the air is too nearly saturated to permit of active evaporation. Again, in the winter, with moderately low temperature, high humidity conditions, such as exist in the South, the mobility of the hydrogen atom present in the water vapor greatly increases the cooling effect and produces a sensation of cold much in excess of what would normally be produced by such temperatures.

Humidity ranging between 40 and 60 per cent produces very little effect on comfort. It does affect comfort very much at extremes, as every one knows who has endured high temperatures with accompanying high humidity or who has been surprised at what temperatures they could stand when the humidity is very low.

### Amount of Water to Be Removed

The amount of moisture removed from the air to lower it from 75 per cent to 60 per cent humidity is approximately one and one-half pints per hour for every 1,000 cu. ft. of air—assuming six changes of air per hour. In the winter when the humidity is low, it requires the addition of one and three-fourths pints per hour to raise the humidity from 15 per cent to 40 per cent per 1,000 cu. ft. of air with six changes per hour.

It is apparent from this that the old practice of keeping a saucer of water on the radiator, filled once or twice a day, has little effect on the humidity of the average room.

### Dirt—Tons of It

The third factor—that of dirt removal—is of great importance in most of our American cities and I'll venture to say that if left to the average housewife she would class this first in the order of importance for her comfort. Surveys of the various cities show Pittsburgh is fourth in the order of dirtiness.

Deposits collected at 20 stations located in various places throughout the city show an average of 1,000 tons of dirt per square mile per year and a maximum of 2,500 tons of dirt per square mile per year. Under such conditions, one can readily understand why we have such large laundry and cleaning bills.

Dirt in the air is made up of particles of varying dimensions, ranging all the way from those that quickly fall out to those that remain in suspension for a great many hours. An instance of this latter kind is supplied by the severe dust storms of the past dry summer which originated in the western states and put dust particles in the air that traversed the entire breadth of this country.

### Dust Menace to Health

Dust is not alone an annoyance, due to its soiling of clothing and house furnishing—although that is enough to justify serious attempts to relieve this condition—but it is a serious health menace as well. This latter condition is due to, first, its prevention of health-giving light reaching the ground, and, second, by the infection and irritation that is carried in this manner.

Hay fever and asthma are examples of the results of this latter difficulty. While it is not feasible to remove a large part of the dirt from the great outdoors it is possible to control the cleanliness of the air that is circulated within a building.

This same type of machine has been used with striking success, in

relieving the sufferings of persons afflicted with hay fever and pollen asthma.

### CO<sub>2</sub> and Odors

One-fourth condition of comfort, as affected by air, concerns its quality. Air consists of four parts nitrogen and one part oxygen. There is also present as a gas—water vapor and some carbon dioxide. The breathing operation adds to the air additional carbon dioxide. In an enclosure it is necessary to change the air to avoid excessive accumulations of carbon dioxide.

While the probability of damage from such accumulations is not great, there is a sensation of stuffiness and drowsiness produced that makes the need for a change of air quite apparent. A five per cent CO<sub>2</sub> content is very high, but there have been cases where men in submarines have survived without injury concentrations of 10 per cent.

### Filtering Odors

In addition to this chemical change in the make-up of the air, there are certain disagreeable odors present caused by breathing, by perspiration and others by smoking. These conditions are particularly noticeable to one coming into such a room from outdoors. They are also apt to be very objectionable in a room "the morning after the night before." Attempts to filter out such odors have thus far met with only meager success.

Charcoal—which appears to offer the most promise—requires too thick a bed and consequently too much power to force the air through it. The law governing the operations of our sense of smell adds to the difficulties of securing freedom from odors by filtering.

While it is perhaps fortunate for us that our sense of smell does not give us a proportional response as the concentration of odors increase, it is troublesome to get a sufficiently

dilute mixture to get beyond our sense of smell. A favorite trick then is to hide the objectionable odor by superimposing on it a pleasant one. Perfumery is commonly used.

### Free Ions Invigorate Air

While it is possible, by control means, to produce an atmosphere in a room of the right temperature, of a satisfactory humidity, properly cleaned and of good chemical condition, reasonably free from odors, it still seems to lack that mysterious something that one finds in the mountains or at the seashore. That invigorating quality that makes one enjoy just breathing such air.

Studies have been made to determine the cause of this difference. The most generally accepted theories now attribute it to differences in the kind of free ions that exist in the air. Some studies have been reported which show quite striking differences on persons subjected to these influences.

When there is a preponderance of positive ions it appears to slow up the mental activities to such an extent that well educated persons, acting as subjects in the tests, were unable to add columns of figures that would ordinarily require little effort.

Conversely, when the negative charges predominate there was increased mental activity and a feeling of buoyancy.

These studies though not complete may eventually make possible the regular production of an idea atmosphere.

The method of securing such charges must originate from an electrical circuit which will produce electrons. Electrons, as you know, are too small to be seen even under the most powerful magnifying glasses; still, it is possible to see the result of their impact on certain surfaces which fluoresce from the bombardment. But it is interesting that these unseen minute ions may hold the secret of the ideal climate.

## U N I T Y

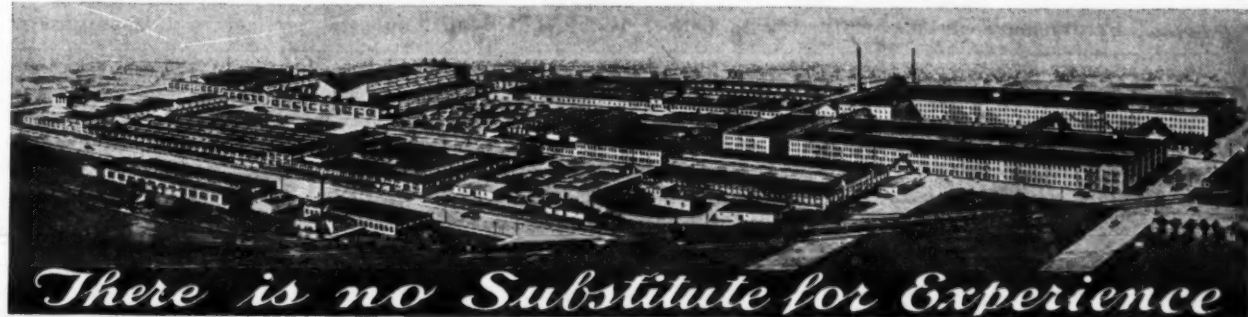
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## SERVEL

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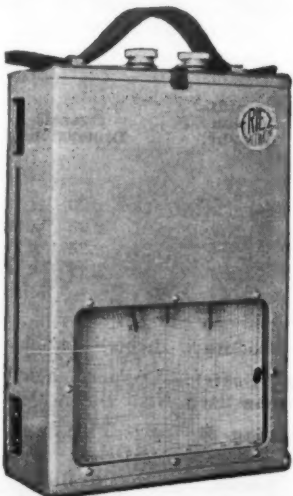
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**Servel**

Servel, Inc.  
Evansville, Ind.

**Functions**—Self-contained type and remote floor type: cooling, dehumidifying, and cleaning.

ying, and cleaning. Suspended type: cooling and dehumidifying. Duct type: cooling, dehumidifying, heating, humidifying, and cleaning.

**Blower**—Direct driven by Wagner motor.

**Compressor**—Servel 2-cylinder compressor for self-contained type, with Wagner repulsion-induction motor, Allen Bradley starter, high side safety cut-out, and pressure control.

**Air Circulation**—Self-contained and remote floor type: air intake in top

and rear, air discharge in top. Suspended type and duct type: air intake in rear.

**Cabinet**—Servel cabinet, with walnut finish for all but duct type, which has green finish.

**Cooling System**—Direct expansion cooling system, with Servel cooling coils.

**Air Cleaning Medium**—Filter.

**Controls**—All types: thermostatic expansion valve, thermostat, humidistat, liquid line solenoid valve.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— Dehumidification Sensible Heat Total B.t.u./hr.	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self-Contained Type</b>																
ACFU-101	\$.....	164.94	.....	.....	10,080	.....	1	Freon or CH <sub>3</sub> Cl	1/50	.....	.....	400	.....	.....	.....	31 x 67½ x 15½
<b>Floor Type</b>																
ACFD-101	.....	164.94	.....	.....	12,240	.....	.....	Freon or CH <sub>3</sub> Cl	1/50	.....	.....	600	.....	.....	.....	31¼ x 43 x 13¼
<b>Suspended Type</b>																
AC-101	.....	160.03	.....	.....	15,840	.....	.....	Freon or CH <sub>3</sub> Cl	1/15	.....	.....	1,000	.....	.....	.....	22½ x 22½ x 23½
<b>Duct Type</b>																
ACO-301	.....	437.14	.....	.....	43,200	.....	.....	Freon or CH <sub>3</sub> Cl	½	.....	.....	2,700	.....	.....	.....	18 x 50½ x 35½

**American Blower**

American Blower Corp., Detroit, Mich.

**Functions**—Remote floor type: cooling and dehumidifying. Suspended type: cooling, dehumidifying, heating, humidifying, and cleaning. Duct type: cooling, dehumidifying, heating, humidifying, and cleaning.

**Cabinet**—Remote floor type: walnut finish. Suspended type: Duco finish.

**Blower**—Remote floor type: two double-inlet Sirocco blowers with General Electric motors. Blowers mounted on motor shaft extension. Suspended type: double-inlet Sirocco blowers belt-driven by G-E motor. Duct type: three Sirocco blowers.

**Air Circulation**—Remote floor type:

air intake in top, air discharge in top. Suspended type: air intake in bottom, air discharge in top. Duct type: air intake in top, air discharge in top. Fresh air intake optional on duct type.

**Cooling System**—Remote floor type: direct expansion or cold water. Copper cooling coils. Suspended type: direct expansion or cold water. Aerofin copper cooling coils.

**Heating System**—Remote floor type: copper coils, which can be used with hot water if desired. Suspended type: Aerofin copper heating coils, can be used with hot water.

**Humidifier**—Remote floor type: self-cleaning impingement type humidifier. Suspended type: spray nozzle humidifier. Duct type: spray nozzle humidifier.

**Air Cleaning Medium**—Remote floor type: bronze wool filter. Suspended type: throwaway filters. Make: Arco, Dustop, or American.

**Controls**—Remote floor type: thermostat, liquid line solenoid valve, water regulating valve. Suspended type: thermostat, humidistat, air by-pass dampers.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Remote Floor Type</b>																
45	.....	.....	3,710	7,090	10,800	.....	.....	Freon	1/40	1,150	4½	300	830	.....	.....	30 x 34 x 11½
60	.....	93	7,080	13,820	20,900	.....	.....	Freon	1/20	870	6	600	960	.....	.....	34 x 42 x 14½
75	.....	129	11,200	22,600	33,800	.....	.....	Freon	1/20	700	7½	1,000	1,000	.....	.....	38 x 48 x 18½
<b>Suspended Type</b>																
112	.....	.....	18,000	35,000	53,000	1,670	.....	Freon	.....	.....	12	1,700	.....	.....	.....	88 x 36 x 36
212	.....	.....	36,000	70,000	106,000	2,300	.....	Freon	.....	.....	12	3,400	.....	.....	.....	88 x 64 x 36
312	.....	.....	54,000	105,000	159,000	3,060	.....	Freon	.....	.....	12	5,100	.....	.....	.....	88 x 96 x 36
215	.....	.....	66,400	128,000	194,400	3,820	.....	Freon	.....	.....	15	6,200	.....	.....	.....	88 x 80 x 49
218	.....	.....	86,500	168,000	254,500	4,890	.....	Freon	.....	.....	18	8,100	.....	.....	.....	97 x 100 x 49
221	.....	.....	108,000	210,000	318,000	.....	.....	Freon	.....	.....	21	10,000	.....	.....	.....	112 x 120 x 49
<b>Duct Type</b>																
35-DS	.....	.....	.....	18,100	32,000	.....	.....	Freon	¾	1,100	.....	836	.....	99,000	.....	60½ x 44½ x 33½
50-DS	.....	.....	.....	29,700	52,500	.....	.....	Freon	¾	970	.....	1,375	.....	177,000	.....	60½ x 53½ x 38½
75-DS	.....	.....	.....	44,000	78,000	.....	.....	Freon	1	995	.....	2,010	.....	253,000	.....	60½ x 74½ x 38½
90-DS	.....	.....	.....	53,900	95,000	.....	.....	Freon	1	760	.....	2,490	.....	313,000	.....	60½ x 72½ x 52½

**Peerless**

Peerless Ice Machine Co., Chicago, Ill.

**Functions**—Cooling & dehumidifying.

**Blower**—Wagner blower, driven by Wagner motor.

**Cabinets**—Peerless.

**Air Circulation**—Air intake, four sides. Air discharge, front.

**Cooling System**—Peerless copper cooling coils.

**Control**—Peerless thermostatic expansion valve.

**Special Features**—Peerless off-center coils encircling fan motor also integral heat exchanger.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Suspended Type</b>																
CC100	\$170.00	70	4,000	8,000	12,000	75	.....	Any	1/40	950	16	12,000	850	.....	.....	22 x 22 x 10
12-C	\$225.00	72	4,000	8,000	12,000	90	.....	Any	1/60	1,000	.....	900	.....	.....	.....	24½ x 24½ x 11
18-C	\$248.00	108	6,000	12,000	18,000	110	.....	Any	1/40	1,100	.....	1,100	.....	.....	.....	24½ x 24½ x 14
24-C	\$279.00	150	8,000	16,000	24,000	130	.....	Any	1/40	1,100	.....	1,400	.....	.....	.....	24½ x 24½ x 18

**Clarage**

Clarage Fan Co.  
Kalamazoo, Mich.

**Functions**—Cooling, dehumidifying, heating, humidifying, and cleaning, all models.

**Blower**—Clarage multiblade blower, belt driven.

**Air Circulation**—Air intake and discharge in top in floor-type duct units. Air intake and discharge in ends on suspended-type units. Fresh air intake optional.

**Cooling System**—Direct expansion or cold water. Trane or Aerofin copper coils.

**Heating System**—Steam or hot water. Aerofin copper heating coils.

**Air Cleaning Medium**—Owens-Illinois filter.

**Humidifier**—Spray type humidifier.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Duct Type</b>																
44	\$.....	.....	11,520-35,700	22,600-78,500	34,120-114,200	1,600-2,125	.....	.....	¼-1½	223-845	(1) 14%	1,300-2,830	706-1,540	72,000-170,200	30-72	60 x 54½ x 51½
46	.....	.....	17,380-53,550	33,900-117,850	51,280-171,400	2,150-2,900	.....	.....	¼-2	278-976	(2) 13	1,945-4,240	763-1,663	107,600-255,000	30-72	60 x 74½ x 51½
48	.....	.....	23,040-71,400	45,200-157,000	68,240-228,400	2,700-3,600	.....	.....	¼-3	202-794	(2) 16½	2,600-5,670	637-1,390	143,700-340,000	30-72	60 x 94½ x 51½
58	.....	.....	38,400-119,000	75,400-261,500	113,800-380,500	3,300-4,400	.....	.....	¼-5	220-653	(2) 17%	4,160-9,070	844-1,562	230,000-544,500	30-72	60 x 94½ x 63½
<b>Suspended Type</b>																
440	\$.....	.....	11,520-35,700	22,600-78,500	34,120-114,200	1,300-1,825	.....	.....	¼-1½	223-845	(1) 14%	1,300-2,830	706-1,540	72,000-170,200	30-72	35½ x 46½ x 64½
460	.....	.....	17,380-53,550	33,900-117,850	51,280-171,400	2,100-2,420	.....	.....	¼-2	278-976	(2) 13	1,945-4,240	763-1,663	107,600-255,000	30-72	35½ x 66½ x 64½
480	.....	.....	23,040-71,400	45,200-157,000	68,240-228,400	2,100-3,000	.....	.....	¼-3	202-794	(2) 16½	2,600-5,670	637-1,390	143,700-340,000	30-72	35½ x 86½ x 64½
580	.....	.....	38,400-119,000	75,400-261,500	113,800-380,500	2,700-3,840	.....	.....	¼-5	220-653	(2) 17%	4,160-9,070	844-1,562	230,000-544,500	30-72	40½ x 86½ x 66½

**King**

King Ventilating Co.  
Owatonna, Minn.

**Functions**—Cooling and dehumidifying.

**Cabinet**—King cases of copper bearing galvanized iron, finished in green enamel.

**Blower**—King curvature-blade fans of aluminum construction.

**Cooling System**—Direct expansion or cold water. Copper coils with aluminum fins, assembled vertically

to facilitate fast removal of the condensed moisture.

King Ventilating Co. also makes a complete line of air washers, which when used with mechanical refrigera-

tion equipment, perform cooling functions.

**Air Circulation**—Air intake in rear, discharge in front. Louvred grille.

**Controls**—Furnished as desired.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity— Dehumidification Sensible Heat Total	Shipping Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Suspended Type</b>																
12	\$.....	35	.....	.....	13,100*	85	.....	.....	1/20	1,140	12	525	.....	60,762	.....	18 x 20 x 19
14	.....	55	.....	.....	20,400*	110	.....	.....	1/15	1,140	14	800	.....	87,637	.....	21 x 23 x 20
17	.....	79	.....	.....	29,500*	160	.....	.....	1/10	840	17	1,200	.....	116,850	.....	24 x 26 x 21
19	.....	106	.....	.....	39,300*	185	.....	.....	½	840	19	1,600	.....	38,950	.....	15 x 17 x 19

\*Rated at 80° F. dry bulb air temperature, with 60 per cent relative humidity and refrigerant temperature at 40° F.

**Cochran**

Cochran Metal Products  
Trenton, N. J.

**Functions**—Cooling, dehumidifying, heating, humidifying, and cleaning.

**Cabinet**—Own make, finished in grained-baked enamel.

**Air Circulation**—Air intake in top, air discharge in bottom.

**Compressor**—Cochran rotary compressor, driven by shaded pole motor.

High side safety cut-out standard equipment.

**Cooling System**—Direct expansion, own make copper coils.

**Blower**—Cochran, direct driven.

**Heating System**—Copper heating coils. Can be used with hot water.

**Air Cleaning Medium**—Filter.

Model No.	Price	Surfaces Cool	Sq. Ft. Heat	—Refrigeration Capacity—			Net Weight	Bore & Stroke	Compressor			Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidi- fication Lbs./hr.	Overall Dimensions
				Dehumidi- fication	Sensible Heat	Total			Speed (R.p.m.)	Motor Hp.	Refrig- erant								
Self-Contained																			
A	\$57.50	5	5	.....	.....	2,000	40	.....	.....	1/100	CH <sub>3</sub> Cl	1/100	1,750	8	500	350	.....	...	30 x 15 x 15
B	77.50	7½	7½	.....	.....	3,000	50	.....	.....	1/100	CH <sub>3</sub> Cl	1/100	1,750	10	750	500	.....	...	30 x 15 x 15
C	97.50	10	10	.....	.....	4,000	60	.....	.....	1/100	CH <sub>3</sub> Cl	1/100	1,750	12	1,000	750	.....	...	30 x 15 x 15



## Ingenious Control System Marks 'Comet' Train Air Conditioning

PITTSBURGH—New Haven's 100-mile-an-hour Diesel-driven, all-aluminum train, the Comet, has been completely air-conditioned with Westinghouse's electro-mechanical system for railway passenger cars.

The system, as described by A. J. Schoch, application engineer of Westinghouse Electric & Mfg. Co., includes refrigeration capacity equivalent to 14 tons i.e. per 24 hours. Two Freon compressors are driven by direct-connected d. c. motors of 12-hp. each. One of the power units, with its condenser and liquid receiver, is mounted in each of the power compartments at the end of the train.

The compressor and motor are mounted on a common bedplate which in turn is mounted on the car floor. The condenser is divided into two sections, one section on each side of the car at the intakes for the air to the engine cooling radiators.

### Pushbutton Gives Precooling

Normally the compressor motor receives its power from the auxiliary generator. When the engine is idling, the reduced voltage of the auxiliary generator results in a corresponding reduction in air cooling. For precooling the train or during long station stops, if full output is desired, the compressor motor is transferred to the main generator by pressing a push button located near the engineman.

### Two Units Per Car

Two air-conditioning units are provided for each car of the train, to obtain maximum head room under the unit. Each unit consists of evaporator coils, heating coils, fans, and motors, the expansion control apparatus and the drip pan.

Two units are mounted side by side in the center of the car directly over the entrance. On account of the greater seating capacity of the center car, the two units have a cooling capacity of 2½ tons each. For the end cars, the units have a cooling effect of 2 tons each.

Each 2½-ton unit circulates approximately 1,000 cu. ft. of air per minute and the 2-ton unit circulates approximately 800 cu. ft. of air per minute.

### Ingenious Automatic Control

The operation of the two compressors and six air-conditioning units is automatically controlled. One compressor unit normally supplies the two air-conditioning units in the power car and one air-conditioning unit in the middle car. Cooling thermostats with three tubes for low, medium or high setting, control the operation of the compressors.

Each compressor unit is controlled by two thermostats, one located in the passenger compartment of the power car and the other located in the middle car.

The "cutting in" of either of the two thermostats starts the compressor unit which it controls. Both thermostats must "cut out" to shut down the compressor unit, but the outputs of the air-conditioning units are controlled separately.

For instance, while the "cutting out" of the thermostat in the power car does not shut down its compressor unit, it does cut out the air-conditioning units in that car. This is brought about by closing off the refrigerant to these conditioning units.

The thermostats control the operation of electro-magnetic valves in the refrigerant line, and the eight separate units (two compressor units and six air-conditioning units) are automatically controlled by three thermostats, one located in the passenger compartment of each power car and one located in the middle car.

### Compressor

The compressor is of the vertical, 2-cylinder, reciprocating type with fins on the cylinders for air cooling. It is supported by four feet on the bottom part of the crankcase. The compressor is shipped with its full charge of six quarts of oil in its crankcase. The oil level is determined by two-sight gauges in the compressor crankcase, one at the full position and one at the refill position.

A shaft seal prevents the escape of refrigerant along the shaft extension of the compressor. It consists of a metal-to-metal fit between a shoulder on the rotating shaft and a stationary collar mounted on flexible (siphon) bellows. A spring incorporated in the assembly maintains the sealing pressure between the collar and the shaft.

### Oil Separator

Freon refrigerant in its liquid state will mix readily with oil so that oil is carried into the refrigerant piping. This oil is removed and replaced in the crankcase, instead of carrying it into the cylinders where it is liable to damage the valves, by an oil separator in the suction line.

### Condensers

The condensers of finned tube construction are used with each compressor. The condensers are mounted one in each side of the engine compartment in the air intake opening for the fans supplying air to the engine cooling radiators.

### Liquid Receivers

The liquid receiver is arranged for separate mounting and is equipped with valves so that the Freon may be pumped into the receiver and held there while the system is opened for repairs. It is also equipped with a liquid line strainer and a sight gauge.

### Cooling Coils and Heating Coils

Both cooling and heating coils are made of lightweight, non-corrodible tubing with radiating fins. This tubing is designed for operating pressures up to 200 lbs. per sq. in., and is tested up to 1,000 lbs. per sq. in. with hydrostatic pressure. It is also applicable for temperatures up to 388° F.

The drip pan is located under these coils to catch the condensate from the cooling coils resulting from the dehumidification of the air. It has a drain connection.

### Ventilating System

Two fans located in the rear of the unit produce the air circulation. These fans are of the centrifugal type, and are designed and mounted so as to give quiet operation. The fan hubs are of non-corrodible material so that they will not rust to the shaft. The motors are operated from the power system of the car.

Each unit is designed to circulate 1,050 cu. ft. of air per minute to produce its rating of 2.5 tons of refrigeration. Where less output is required the fan speed should be adjusted to produce a proportionately lower rate of air circulation.

### Piping and Accessories

The liquid refrigerant line is carried from the liquid tank in the engine room and connects to three of the units. Each unit is equipped with magnetically operated valves used to control the sequence of the unit, an automatic expansion valve controlled primarily from the temperature of the refrigerant in the suction manifold, and distributing tubes, which control the distribution of the refrigerant in the sections of the cooling coil.

The suction line connects the cooling coils of three units with the compressor and carries the vaporized refrigerant back to the condenser.

The steam supply and return lines are connected through pressure reducing valves and steam traps, similar to the side heating pipes. To secure satisfactory operation control of overhead heat from the air conditioners must be coordinated with the floor or side heating equipment.

When cooling under conditions of high relative humidity, considerable moisture collects in the drain pan and must be carried away efficiently. The drain pipe has much pitch and as few bends or fitting as possible.

### General Description of Compressor Control

The electrical control equipment for the Comet's air-conditioning system consists of the following apparatus:

1. Flipon switches for circulating fan motor circuit.
2. Compressor motor starting panel.
3. Compressor motor control push buttons.
4. Electrically operated refrigerant fluid valves.

### Flipon Switch

The Flipon switch controls the operation of the circulating fans located in the air-conditioning units and is located with the temperature control panel. The switch is designed for manual operation as a quick make and quick break toggle switch combined with automatic overload protection accomplished by means of a bi-metal heater element in series with the contacts.

On an abnormal overload the heater element automatically trips the switch. The automatic tripping of the switch is distinguished from manual operation by the position of the handle. Upon automatic tripping the handle assumes a position midway between manual "on" and "off" positions.

These switches are all incorporated in the Vapor Car Heating and Lighting Co. control panel which controls heating as well as air distribution.

### Compressor Motor Control Buttons

These control buttons are located in the push button box at the engine and train control stand. They are used for manually starting or stopping the condensing sets, or for transferring the sets to the main generator during engine idling periods where rapid precooling of cars is necessary.

Three control buttons are located at each operating stand. After the engines are started and the controller handles are placed in the normal

operating positions, closing the No. 1 and No. 2 air-conditioning buttons starts the condensing sets. These two buttons are provided for individual operation of the sets which normally obtain power from the auxiliary generators of the respective power plants.

During engine idling periods, the auxiliary generator operates at reduced voltage and the condensing sets operate at reduced capacity. If, during these idling periods, rapid cooling of the cars is necessary, closing the spring-returned air-conditioning transfer button will automatically change the connections to operate the condensing sets at normal capacity from their respective main generators.

Operation from the main generators is continued until the controller main handle has been placed in a running position at which time the two sets are automatically transferred back to the auxiliary generator connections. To stop the condensing sets, it is only necessary to open the individual air-conditioning buttons.

### Electrically Operated Refrigerant Valves

Assembled as a part of each air-conditioning unit are two electrically operated valves in the refrigerant line supplying that unit, which control the supply of refrigerant to the air-conditioning unit.

The fluid valve is a self-contained unit consisting of a moving armature and valve assembly within a cylindrical chamber. The magnetic force for unseating the valve is furnished by a coil which surrounds the cylindrical chamber. A casting completes the assembly and provides a return path for the magnet circuit. The valve is normally closed by gravity and pressure in the refrigerant line.

Since one compressor supplies refrigerant to three air-conditioning units, two of which are located in the power car and one in the middle

car, it becomes necessary to control the output of the air-conditioning units as well as the compressor units, in order to maintain any desired temperature in any passenger compartment. This feature is accomplished by means of the electrically operated fluid valves controlled by thermostats.

### Thermostatic Control of Air-Conditioning Units

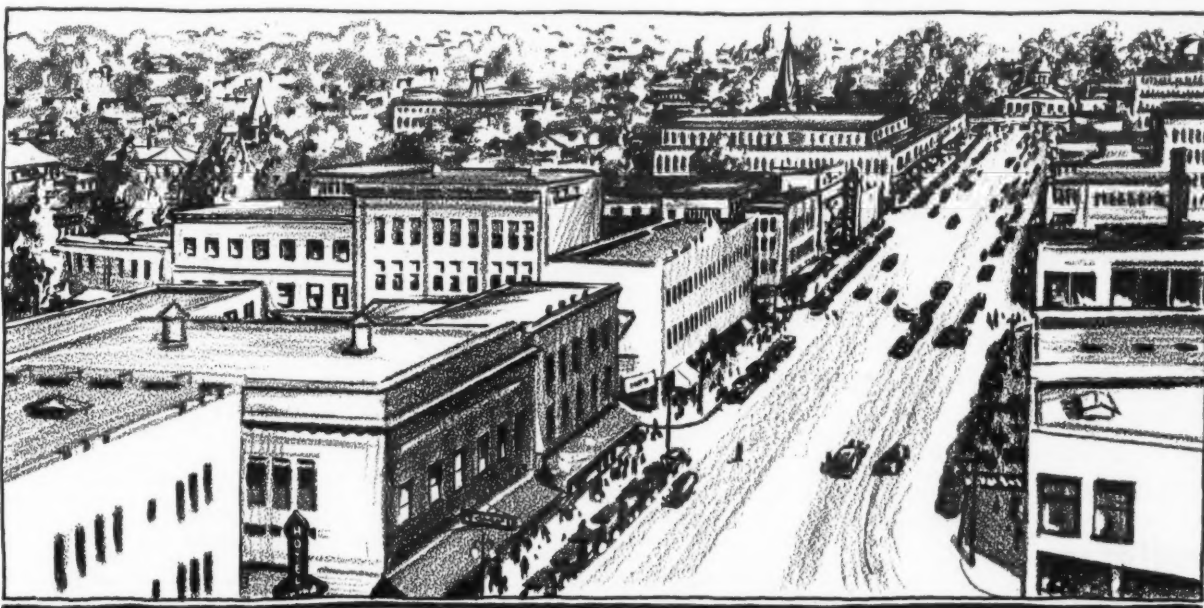
The eight separate units (two compressor units and six air-conditioning units) are automatically controlled by three thermostats, one located in the passenger compartment of each power car and one located in the middle car. (Thermostats are supplied by Vapor Car Heating Co.)

While the "cutting out" of the thermostat in the passenger compartment of the power car does not shut down the compressor unit, it does cut out their air-conditioning units in that car. In like manner, the "cutting out" of the thermostat in the middle car does not shut down either compressor but it does cut out the air-conditioning units in this car.

The individual air-conditioning units are cut out by closing off the refrigerant to these units. The thermostats control the operation of the electrically operated valves in the refrigerant lines.

When the temperature of the air inside a given passenger compartment falls below the setting of the thermostat in that compartment, the thermostat contacts interrupt the feed circuit to the fluid valve operating coils thereby closing the valve ports and cutting off the supply of refrigerant to that particular air-conditioning unit or units.

Conversely when the temperature of any given compartment increases above the thermostat setting, its contacts open the valve ports of the fluid valves which it controls allowing refrigerant to again pass through the coils of conditioning unit or units.



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**Ilg**

Ilg Electric Ventilating Co.  
Chicago, Ill.

Functions—Model 501: cooling, dehumidifying, heating, humidifying.

and cleaning; all others: cooling and dehumidifying.

Cabinet—Ilg cabinets, self-contained and remote floor-type models finished in walnut grain metal, others in cream enamel.

Compressor—Self-contained model

has 2-cylinder compressor with 1½ motor and motor starter, and equipped with high side safety cut-out.

Blower—Ilg blower, direct driven by 1½ motor.

Air Circulation—Self-contained model: intake in back, discharge in

front; remote floor-type models: air intake in front, air discharge in top; suspended type: air intake in back, air discharge in front. Uniflo grilles.

Air Cleaning Medium—Owens-Illinois filter.

Controls—Thermostatic expansion

valve all models. Thermostat optional on all models. Self-contained model has liquid line solenoid valve and water regulating valve.

Cooling System—Self-contained type: direct expansion; others: direct expansion or cold water. Ilg copper cooling coils.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Shipping Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self-Contained Type</b>																
11*	\$315.00	...	...	6,000	400	...	460	½	Freon	1/70	1,140	10	280	500	...	42" x 29" x 18"
<b>Remote Floor Type</b>																
500	\$185.00	...	...	12,000	185	...	...	...	*Freon	1/20	1,140	6½	500	380	...	32" x 32" x 13"
501	220.00	...	...	12,000	210	...	...	...	*Freon	1/20	1,140	6½	500	380	46,700	32" x 32" x 13"
<b>Suspended Type</b>																
135	\$106.00	...	...	14,100	154	...	...	...	*Freon	1/20	1,140	13	810	620	...	21" x 21" x 18"
175	122.00	...	...	20,900	193	...	...	...	*Freon	½	855	17	1,220	650	...	24" x 24" x 21"
195	150.00	...	...	30,400	248	...	...	...	*Freon	¾	855	19	1,970	750	...	27" x 27" x 26"
255	206.00	...	...	44,500	310	...	...	...	*Freon	1	685	25	2,500	650	...	33" x 33" x 26"

**Strang**

Strang Air Conditioning Corp.  
Kansas City, Mo.

Functions—Cooling, dehumidifying, humidifying, and cleaning.

Cabinet—Steel cabinet with walnut finish.

Compressor—Models A and C have 2-cylinder compressor, model B has a 4-cylinder compressor. Century or Wagner compressor motor, high side safety cutout.

Air Circulation—Air intake in back, air discharge in top front. Fresh air intake provided.

Cooling System—Direct expansion cooling system, with tinned copper cooling coils.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self-Contained Type</b>																
A	...	...	...	...	2 x 1½	400	¾	*	...	...	...	300	...	...	...	42" x 32" x 17"
B	...	...	...	...	1¾ x 1¾	500	1	*	...	...	...	350	...	...	...	44" x 40" x 19"
C	...	...	...	...	2¾ x 3	400	1½	*	...	...	...	400	...	...	...	56" x 36" x 28"

**Betz**

Betz Unit Air Cooler Co., Kansas City.

Functions—Cooling, dehumidifying,

heating, humidifying, and cleaning.

Air Circulation—Air intake in bottom. Air discharge in top or front. Fresh air intake provided if desired.

Cooling System—Spray type, employing cold water.

Heating System—Own make aluminum or copper heating coils. Can be

used with hot water.

Type of humidifier—Spray type.

Air Cleaning Medium—Water spray.

Controls—Liquid line solenoid valve and thermostat standard. Thermostatic expansion valve, humidistat, and water regulating valve as required.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Shipping Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Remote Floor Type and Duct Type</b>																
Unicoils	...	...	110	210	...	...	...	Any desired	...	...	...	400	*	...	...	7½" x 22" x 18 to 13" x 48" x 66"
*Variable.	...	...	to 1,500	to 2,200	...	...	...	...	...	...	...	to 13,000	...	...	...	...

**De La Vergne**

De La Vergne Engine Co.  
Philadelphia, Pa.

Functions—Models 1AA and 1.5AA: cooling, dehumidifying, heating, humidifying, and cleaning. Others: cool-

ing, dehumidifying, heating, and cleaning.

Cabinet—Wood or metal cabinet with walnut or mahogany finish for all but model 4AA, which is metal cabinet with finish as desired.

Compressor—De La Vergne 2-cyl-

inder compressor, with high side safety cut-out and special type of compressor control.

Blower—Direct driven.

Air Circulation—All but model 4AA have air intake in side, air discharge in top. Model 4AA has air intake in

front and bottom, with air discharge in the front face of the unit. De La Vergne grilles. Fresh air intake provided on all models.

Cooling System—Direct expansion. De La Vergne copper cooling coils.

Heating System—Models 1AA,

1.5AA, and 4AA: by reversed refrigeration cycle; others by steam. De La Vergne copper heating coils.

Control—Float valve refrigerant control.

Air Cleaning Medium—Filter.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Shipping Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self-Contained Floor Type</b>																
1-AA	\$.....	250	250	12,000	1,000	1,750	1½	Freon	¾	1,150	9½ x 11	400-750	200	...	...	48" x 52" x 22"
1-AW	.....	500	...	12,000	1,000	1,750	1½	Freon	¾	1,150	9½ x 11	600	300	...	...	48" x 52" x 22"
1.5-AA	.....	250	250	18,000	1,000	1,750	2	Freon	¾	1,750	9½ x 11	600-1,000	300	...	...	48" x 52" x 22"
1.5-AW	.....	500	...	18,000	1,000	1,750	2	Freon	¾	1,750	9½ x 11	800	400	...	...	48" x 52" x 22"
*4-AA	.....	500	250	48,000	1,500	1,750	5	Freon	1	1,750	12	1,500	750	...	...	18" x 62" x 60"

**Kauffman**

Kauffman Air Conditioning Corp.  
St. Louis, Mo.

Functions—Self-contained models: cooling, dehumidifying, and cleaning. Remote floor type: cooling, dehumidifying, heating, humidifying, and clean-

ing. Suspended type: cooling and dehumidifying. Duct type: cooling, dehumidifying, and cleaning.

Cooling System—Kauffman copper cooling coils, aluminum fins.

Blower—Self-contained models: multi-blade and propeller type blower, driven by Baldor or Wagner capacitor

motors. Remote floor type: centrifugal blower. Suspended type: propeller-type blower. Duct type: multi-blade blower.

Cabinet—Kauffman cabinet. Self-contained, remote floor type, and suspended-type models finished in walnut or mahogany; duct type in gray or black.

Type of Filter—Spun glass.

Air Circulation—Self-contained models: air intake, back; discharge, top. Remote floor type: air intake bottom, discharge top; multi-vane grilles. Duct type: air intake back, discharge front.

Compressor—Two-cylinder compres-

sor used in self-contained model. Refrigerant charge: models F & K, 3 lbs.; models I and L, 7 lbs.

Controls—Self-contained type: high pressure cut-out, thermal overload, solenoid water valve. Duct type: thermostat and humidistat.

Heating System—Kauffman copper heating coils, aluminum fins.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Self-Contained</b>																
F	\$400.00	92	...	7,000	350	550	½	Freon	1/20	1,140	(4) 4½	275	...	...	...	38" x 15" x 30"
I	550.00	141	...	14,000	450	700	1	Freon	1/15	850	(4) 6	500	...	...	...	45" x 17" x 32"
K	300.00	92	...	7,000	300	550	½	Freon	1/50	1,140	(1) 12	250	...	...	...	36" x 15" x 32"
L	475.00	141	...	14,000	425	700	1	Freon	1/50	1,140	(1) 16	500	...	...	...	43" x 17" x 32"
<b>Duct Type (ceiling)</b>																
62H	\$235.00	300	150	46,600*	350†	...	...	Freon	1/10	850	6	800	...	66,000†	...	16" x 33" x 33"
75H	350.00	441	200	62,400*	470†	...	...	Freon	¾	800	7½	1,100	...	104,000†	...	18½" x 36" x 36½"
76H	465.00	510	247	90,000*	571†	...	...	Freon	¾	870	7½	1,500	...	140,000†	...	18½" x 43" x 36½"
92H	581.00	840	405	128,000*	650†	...	...	Freon	¾	720	9	2,500	...	208,000†	...	22" x 47" x 39"
93H	685.00	1,050	510	167,240*	1,050†	...	...	Freon	¾	750	9	3,700	...	312,000†	...	22" x 69" x 39"
94H	775.00	1,506	750	220,500*	1,140†	...	...	Freon	1	720	9	5,000	...	388,000†	...	35" x 65" x 39"
122H	789.00	1,470	750	220,560*	1,228†	...	...	Freon	1	750	12	6,200	...	388,000†	...	30" x 61" x 44"
123H	975.00	2,280	1,125	315,120*	1,561†	...	...	Freon	1½	680	12	8,200	...	556,000†	...	30" x 36" x 44"
124H	1,055.00	2,280	1,125	401,880*	1,716†	...	...	Freon	2	720	12	10,500	...	708,000†	...	30" x 110" x 44"

\*Cost of heating coil added. \* Maximum capacities 6-row coil—capacity reduced with reduced number of coils. †Weight of unit with smallest coil—unit with larger coils proportionately heavier.

†Maximum capacities 3-row coil—capacity reduced with number of coils.

Model No.	Price	Surfaces Sq. Ft. Cool Heat	Refrigeration Capacity—Dehumidification Sensible Heat Total	Net Weight	Bore & Stroke	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
<b>Duct Type (floor)</b>																
62V	\$436.00	300	150	46,600*	543†	...	...	Freon	1/10	850	6	800	...	66,000†	...	89" x 33" x 14½"
75V	485.00	441	200	62,400*	635†	...	...	Freon	¾	800	7½	1,100	...	104,000†	...	92" x 36" x 17"
76V	595.00	510	247	90,000*	717†	...	...	Freon	¾	870	7½	1,500	...	140,000†	...	99" x 43" x 17"
92V	693.00	840	405	128,000*	947†	...	...	Freon	¾	720	9	2,500	...	208,000†	...	115" x 47" x 23"
93V	855.00	1,050	510	167,240*	1,275†	...	...	Freon	¾	750	9	3,700	...	312,000†	...	116" x 69" x 23"
94V	989.00	1,506	750	220,500*	1,315†	...	...	Freon	1	720	9	5,000	...	388,000†	...	116" x 85" x 35"
122V	989.00	1,470	750	220,560*	1,420†	...	...	Freon	1	750	12	6,200	...	388,000†	...	120" x 61" x 30"
123V	1,170.00	2,280	1,125	315,120*	1,690†	...	...	Freon	1½	680	12	8,200	...	556,000†	...	120" x 86" x 30"
124V	1,290.00	2,280	1,125	408,880*	1,845†	...	...	Freon	2	720	12	10,500	...	708,000†	...	120" x 110" x 30"

\*Cost of heating coil added. \* Maximum capacities 6-row coil—capacity reduced with reduced number of coils. †Weight of unit with smallest coil—unit with larger coils proportionately heavier.

†Maximum capacities 3-row coil—capacity reduced with number of coils.

	215.00	160	135	23,500*	1/20	1,140	4½	500	47,000†	40	x 27	x 13
	310.00	244	210	31,700*	1/10	850	6	900	63,000†	49	x 30	x 13
	380.00	500	405	60,500*	½	850	7½	1,300	120,000†	63	x 32	x 15
	455.00	616	465	62,600*	¾	850	7½	1,500	124,000†	69	x 32	x 15
	500.00	780	600	81,700*	1½	850	9	1,800	162,000†	73	x 38	x 19

Maximum capacities 4-row coil—capacity reduced with reduced number of coils. †Maximum capacities 3-row coil—capacity reduced with reduced number of coils.



## SERVICE

### How to Service 'Socold' Units; 2. Valves, Condensers, Controls

THIS is the second of a series of two articles on servicing Socold household electric refrigerators which were manufactured by the Socold Refrigerator Corp., Lynn, Mass. The first article, appearing in the May 15 issue, discussed the compressor and expansion valve. This information became available through the cooperation of subscriber Alfred K. Anderson, West Orange, N. J., who had a copy of the Socold Direct Expansion Manual in his files.

#### Discharge Valves

The valves which are in the cylinder heads are made up of three monel discs, the lower one being ground and lapped to fit the valve seat. The seating of the valves is made positive by the use of valve springs.

This construction makes a very simple, quiet, and efficient discharge valve; and one that is easy to reach and clean if it ever requires attention.

#### Inlet or Suction Valves

The inlet valves are simply ports in the cylinder walls. These ports are kept closed by the piston except at the end of the down stroke, when the port is opened long enough to allow the proper amount of gas to enter the cylinder.

This construction never needs attention.

#### Gauge

The gauge marked C-235 is connected to the manifold, which is on the low pressure or suction part of the compressor.

The heavy black mark is called neutral and denotes a pressure of approximately 15 lbs. per square inch. To the left of the mark is called the vacuum side, while to the right is called the pressure side.

When the compressor is running under normal conditions and system is refrigerating properly, the pointer of gauge should be on the mark or slightly to the left of mark.

When the system is supposed to be working, but the gauge pointer shows from  $\frac{1}{8}$  inch to  $\frac{1}{4}$  inch to the left of the mark, there is a partial block somewhere. A valve may be partly closed, the  $\frac{1}{4}$  inch tubing may be blocked, or the strainer or screen has become dirty. The latter is probably the trouble and may be remedied by following the instructions given under "Method of Cleaning Expansion Valve."

When the compressor shuts down, the pointer gradually works over to the right or pressure side of mark, usually from  $\frac{1}{8}$  to  $\frac{1}{2}$  of an inch.

After starting up, the pointer should return to the mark, the length of time it takes being dependent on the length of time it was shut off. If the system has been shut down for a period of days, it might take 30 minutes or more; but when running normally it is usually only a matter of a few minutes.

If the pointer refuses to return to the mark, no refrigeration is the re-

sult. There are three probable reasons for this:

1. Dirty compressor valves. (See instructions under "Cylinder Heads" for remedy).

2. Dirty expansion valve. (See "Expansion Valve").

3. Low side flooded—This is more of a possibility than a probability. If it ever does happen, close valve No. 3 which connects to the bottom of the condenser and continue to run compressor until the pointer pulls down to the left side of neutral mark, at which time valve No. 3 may be reopened.

If with valve No. 8 closed, the gauge stayed on the pressure side, then the compressor valves must be cleaned.

#### Cleaning Compressor Valves

With compressor running and valve No. 8 closed, close valve No. 2 which is the valve connected to the top turn of the condenser. After valve No. 2 is closed, stop the motor. Of course, if one head is working, some gas can be pumped out, therefore, the longer the pumping is continued the nearer the pointer will approach the neutral mark.

Disconnect the connector No. 23, which is the  $\frac{1}{4}$  inch line that joins the compressor head to the condenser. Use 28 per cent ammonia to neutralize the gas which is left in the compressor.

Take off the heads, being careful not to lose the springs.

The Monel discs may be cleaned with alcohol, and if the bottom one is pitted it should be reground to fit valve seat. For a grinding compound use a mixture of Bon Ami powder, ground rotten stone, and refrigerating oil. Be sure to keep this disc in the original head. Do not interchange them.

If the gaskets were injured when taken off, replace with new ones.

When sure that the valves are clean and seat well, reassemble the heads and fasten in place. (Note: After the compressor has run and become hot, the cap screws which hold the heads down should be retightened).

The No. 23 connector should now be

### Cylinder Head Assembly

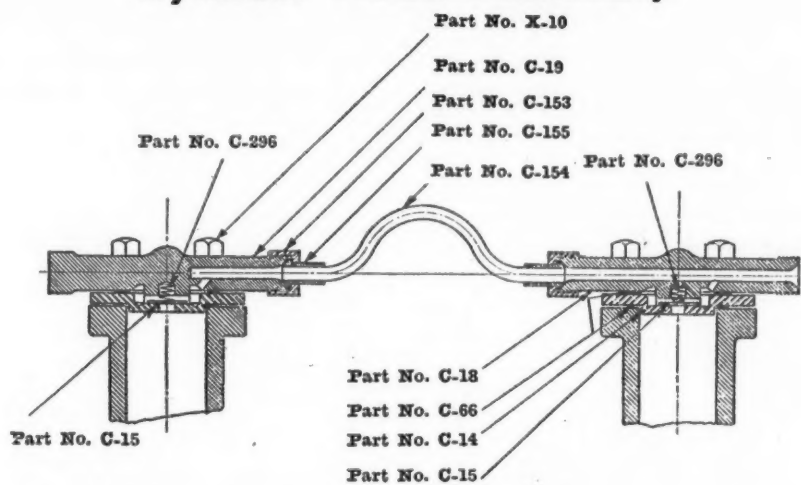


Fig. 5—Cylinder heads showing disc valves and reseating springs.

#### Cylinder Heads

The cylinder heads are made in two sections. The lower part or cage contains the valve seat and to this seat the Monel discs must be lapped. In each head there are two gaskets, one between the lower and upper sections and one between the lower section and top of cylinder. Each head is held down by four cap screws.

Effect of dirt in cylinder heads. Dirt would prevent valves from seating, and the gauge pointer would stay to the right of mark.

Close valve No. 8 which is attached to the manifold and keep compressor running.

If valves are O.K., the gauge pointer will pull down to the left of mark. (If before closing valve No. 8, the gauge showed a pressure, the trouble must be with the expansion valve and not with compressor valves).

reconnected, making it up tight to the cylinder head, but leave loose where it joins valve No. 2.

Start motor, and if valves are now working, any air and gas which is in the compressor will be pumped out at the loose connection to valve No. 2; and the gauge should show about  $\frac{1}{4}$  inch to the left of the neutral mark.

If a vacuum is not obtained, more valve grinding is necessary.

If, however, a good vacuum shows, then tighten the connections at valve No. 2 and stop the motor.

Open one-quarter turn and quickly close valves No. 2 and No. 8. This lets gas into the compressor, allowing tests to be made for possible leaks.

If all connections are tight, open wide valve No. 2, start the motor and slowly open valve No. 8, so that pointer will stay on the mark. If No. 8 is opened too quickly the pointer may show a pressure, in which case it will take much longer to get system working properly.

#### To Change Compressor

To replace a compressor, it is first necessary to close valve No. 8, and pump out the gas as was done when cleaning the compressor valves.

When the gauge shows a vacuum, most of the gas is pumped into the condenser. Then close valve No. 2, disconnect valve No. 8 from the manifold of the compressor (being careful not to lose the split ring) and also remove the  $\frac{1}{4}$  inch tubing from cylinder head to condenser.

Note: It is well to have ready one  $\frac{1}{4}$  inch jam nut with a leather washer, and one  $\frac{1}{2}$  inch-20 jam nut with a leather washer, so the pump may be immediately sealed, to prevent gas from continuing to flow out or moisture from entering the compressor while change is being made).

A new compressor is always equipped with a No. 8 valve. This No. 8 valve should be put on the old compressor before shipping, because a valve makes a much tighter joint than is possible with a leather washer.

To speed up the removal of a compressor, the four bolts which fasten it in place, should be removed before any connections are broken.

The motor and its pad may or may not be disconnected at the option of the workman.

In putting on a new compressor be sure to line up the motor pulley with the fan pulley. The motor pulley has a  $\frac{1}{8}$  inch Allen set screw.

After tubing connections are remade, pump out the air, test for

(Concluded on Page 29, Column 1)

## SERVICE OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN SERVICE WORK

### No. 6—Purging Suction Line, Liquid Line, and Evaporator (Dry Expansion System)

By K. M. Newcum

#### REASON:

Before putting a system into operation after repairs have been made, and where the lines were loose, it is necessary to remove the air from the line. This is done as follows:

#### PROCEDURE:

A. Loosen suction line flare nut at suction line shut-off valve on compressor.

B. Close suction line shut-off valve on compressor, if it is not already closed.

C. Hold tool against expansion valve buffer plate with sufficient pressure to open expansion valve.

D. Crack liquid line shut-off valve at compressor until a rush of gas is heard coming from the suction line at compressor. Hold the pressure against the valve buffer plate during this operation.

E. Close liquid line shut-off valve all the way to the right.

F. Tighten suction line flare nut at valve on compressor.

G. Open suction line shut-off valve at compressor so the gauge will register.

H. Crack liquid line shut-off valve admitting sufficient refrigerant to build the gauge pressure up to about 10 lbs. pressure then close valve.

I. Test all connections with 26 per cent ammonia.

J. Check with instructor.

Note: DO NOT ALTER EXPANSION VALVE ADJUSTMENT DURING THESE OPERATIONS.

**Wagner Motors.**  
Because of Their Interchangeability  
**Reduce Installation Costs!**

Wagner A.C. refrigerator motors can be changed for the same size D.C. refrigerator motor . . .

since frame, base and shaft dimensions permit interchangeability!

Cost-conscious refrigerator manufacturers realize that their refrigerator installation costs can be reduced if their line of motors have the same frame, shaft, and base dimensions so as to permit interchange of various types and sizes of motors on the same refrigerator.

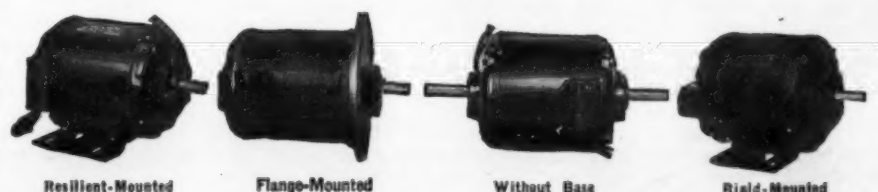
Wagner motors built in the same size of frame (whether repulsion-start-induction, squirrel-cage, direct current, etc.) have the same size and spacing of mounting holes, and are therefore interchangeable. Thus a 57-frame repulsion-start-induction motor is interchangeable with a 57-frame squirrel-cage motor or a direct current motor. Further, base dimensions of Wagner motors are selected to permit a large number of size changes. Thus motors of 1/10, 1/8, 1/6 and 1/4 horsepower (in 1800 r.p.m.) of the same type are all interchangeable as far as base dimensions are concerned. In the 1/4 horsepower ratings of the repulsion-start-induction motors the shaft height and dimensions will vary slightly from the other ratings.

Below are illustrated four of several types of mountings preferred by refrigerator manufacturers. Each type of mounting is available on all types of Wagner motors.

There are many other considerations besides interchangeability provided for in Wagner design and construction such as: quietness, dependability, appearance, and performance. Write for Bulletin 187 which discusses these considerations and completely describes Wagner small motors.

5635-4C

**Wagner Electric Corporation**  
6400 Plymouth Avenue, Saint Louis, U.S.A.



### Socold Assembly Showing Parts

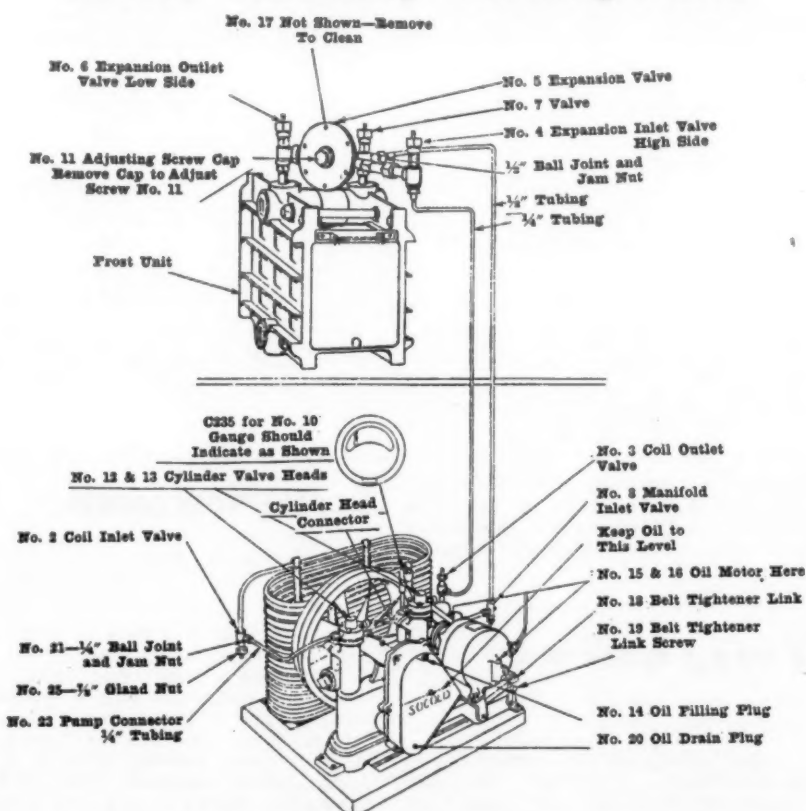


Fig. 1. General layout of the Socold household refrigeration system, showing compressor, chilling unit, and various valves, numbered as referred to in the service manual printed on this and the following page.



## Fedders

Fedders Mfg. Co.  
Buffalo, N. Y.

**Cabinet**—Fedders all-copper and brass finish.

**Blower**—4-blade fan, direct driven.

**Air Circulation**—Air intake in rear,

discharge in front. Inclined cooling element eliminates louvers.

**Cooling System**—Direct expansion. Fedders continuous tube, directed-flow coils, with provision for condensate

to drain from rear of fins.

**Controls**—Thermostatic expansion valve. Intermittent switch may be used if desired.

**For Duct-Type Units**—Fedders also offers a complete line of cooling and dehumidifying coils for duct-type air-conditioning units. These units can be supplied in any size desired.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity—	Net Weight	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool Heat	Dehumidification Sensible Heat Total												
<b>Suspended Type</b>															
208	\$.....	21	.....	1,230*	28	.....	Optional	1/250	1,650	8	360	.....	.....	.....	11½ x 13½ x 11½
210	.....	30	.....	2,100*	30	.....	Optional	1/125	1,500	10	388	.....	.....	.....	11½ x 13½ x 12½
212	.....	47	.....	3,500*	44	.....	Optional	1/30	1,150	12	786	.....	.....	.....	14 x 15½ x 15½
214	.....	63	.....	4,550*	49	.....	Optional	1/30	1,150	14	1,146	.....	.....	.....	16½ x 17½ x 16
216	.....	83	.....	5,600*	77	.....	Optional	1/20	850	16	1,228	.....	.....	.....	19½ x 19½ x 18
316	.....	125	.....	7,000*	86	.....	Optional	1/20	850	16	1,190	.....	.....	.....	19½ x 19½ x 20½
318	.....	215	.....	12,310*	162	.....	Optional	1/15	860	18	1,852	.....	.....	.....	24½ x 23½ x 26½
518	.....	359	.....	18,220*	209	.....	Optional	¾	1,150	18	2,500	.....	.....	.....	24½ x 23½ x 30½

\*Refrigerant temperature 24° F.

## Trane

The Trane Co., LaCrosse, Wis.

**Functions**—Cooling, dehumidifying, and heating. Humidifying and cleaning optional.

**Cabinet**—Remote floor type and

suspended type (in series 205 to 212)—Trane cabinet of furniture steel, finished in dark brown wrinkle. Suspended type (in series 2103-4112) and duct type—Trane sheet metal cabinet finished in baked silver enamel or gray priming coat if desired.

**Blower**—Trane forward-curved multi-blade blower.

**Air Circulation**—Remote floor-type units and suspended-type units (series 205 to 212)—air intake in front at bottom of unit; air discharge in top face of unit; fresh air intake optional. Duct type and suspended type (series 2103 to 4112)—intake in back of unit, discharge in front of unit; fresh air

intake optional. Trane "Freeflo" grilles (for suspended and duct-type units, diffusers or nozzle outlets can be furnished).

**Cooling System**—Direct expansion or cold water. Trane copper coils.

**Heating System**—Trane steam coils.

Hot water can be used if cold water is used for cooling.

**Air Cleaning Medium**—Trane copper wool filter.

**Controls**—Thermostatic expansion valve, thermostat, humidistat, liquid line solenoid valve, water regulating valve.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity—	Shipping Weight	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool Heat	Dehumidification Sensible Heat Total												
<b>Remote Floor Type</b>															
Series 52 to...	\$150 to	.....	.....	7,950 to	.....	.....	Optional	1/30 to	850	4½ to	300 to	.....	.....	.....	.....
122	\$512.00	.....	.....	84,000	.....	.....	Optional	½	...	10	2,500	.....	.....	.....	.....
<b>Suspended Type</b>															
Series 205 to...	\$148.50 to	.....	.....	7,950 to	.....	.....	Optional	1/30 to	850	4½ to	300 to	.....	.....	.....	.....
212	\$586.25	.....	.....	91,600	.....	.....	Optional	½	...	10	2,500	.....	.....	.....	.....
Series 2103 to	\$402.00 to	.....	.....	53,000 to	.....	.....	Optional	½ to	438 to	10 to	3,000 to	.....	.....	.....	.....
4112	\$915.00	.....	.....	284,000	.....	.....	Optional	2	927	15	12,000	.....	.....	.....	.....
<b>Duct Type</b>															
Series 2203 to	\$402.00 to	.....	.....	53,000 to	.....	.....	.....	½ to	500 to	10 to	3,000 to	.....	.....	.....	.....
4212	\$915.00	.....	.....	284,000	.....	.....	.....	2	695	15	12,000	.....	.....	.....	.....

## Zephyr Air

Savage Arms Corp.  
New York, N. Y.

**Functions**—Cooling, dehumidifying, heating, humidifying, cleaning—all models.

**Blower**—Aluminum blower wheel. **Cooling System**—Direct expansion or cold water.

**Type of Humidifier**—Air washing in all models.

**Air Cleaning Medium**—Air washing and scrubber plates.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity—	Net Weight	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool Heat	Dehumidification Sensible Heat Total												
<b>Remote Floor Type</b>															
61	\$.....	.....	.....	9,000	.....	.....	Freon	.....	.....	.....	250	.....	.....	6	.....
85	.....	.....	.....	15,000	.....	.....	Freon	.....	.....	.....	500	.....	.....	12	.....
<b>Self-Contained Floor Type</b>															
60	\$.....	.....	.....	9,000	.....	.....	Freon	.....	.....	.....	250	.....	.....	6	.....
<b>Duct Type</b>															
86	\$.....	.....	.....	30,000	.....	.....	Freon	.....	.....	.....	1,000	.....	.....	24	.....
88	.....	.....	.....	60,000	.....	.....	Freon	.....	.....	.....	2,000	.....	.....	48	.....
90	.....	.....	.....	120,000	.....	.....	Freon	.....	.....	.....	4,000	.....	.....	96	.....

## King Zeero

King Zeero Co., Chicago, Ill.

**Functions**—Cooling and dehumidifying. Cleaning optional.

**Cabinet**—King Zeero all-steel welded cabinet, enamel finish, nickel trimmed.

**Blower**—King Zeero fan unit, direct driven.

**Air Circulation**—Air intake in back of cabinet, discharge in front. King Zeero steel grilles.

**Air cleaning**—Spray type, with or without pump.

**Heating System**—Cold water coils can be used with hot water for heating.

**Cooling System**—Direct expansion, brine or cold water. King Zeero spiral fin steel coils.

**Controls**—Expansion valve or float valve. Thermostat extra equipment.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity—	Shipping Weight	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool Heat	Dehumidification Sensible Heat Total												
<b>Remote Floor Type</b>															
9-M	\$210.00	40	.....	9,000	140	.....	Any	1/30	1,140	12	†	.....	.....	.....	35 x 22 x 22
12-M	240.00	53	.....	12,000	160	.....	Any	1/30	1,140	12	†	.....	.....	.....	37 x 22 x 24
18-M	280.00	75	.....	18,000	175	.....	Any	1/10	1,140	16	†	.....	.....	.....	43 x 22 x 24
24-M	320.00	100	.....	24,000	200	.....	Any	1/10	1,140	16	†	.....	.....	.....	49 x 25 x 28

## U. S. Airco

U. S. Air Conditioning Corp.  
Minneapolis, Minn.

**Functions**—Self-contained type: cooling and dehumidifying. Remote floor type: cooling, dehumidifying,

and humidifying. Suspended type: cooling and dehumidifying. Duct type: cooling, dehumidifying, humidifying, heating, and cleaning.

**Cabinet**—Sheet steel cabinet with grained mahogany finish for all except duct type, which is given a shop coat.

**Cooling System**—All but duct type have direct expansion systems, duct type using cold water. U. S. Airco copper cooling coils.

**Blower**—U. S. "Airco" blower, driven by Louis Allis or Century motor.

**Air Circulation**—Air intake at

bottom, discharge at top. Fresh air intake provided on duct-type conditioner. Uniflo grilles used on self-contained and remote floor type, U. S. Airco grilles on suspended type and duct type.

**Air Cleaning Medium**—Spray type.

**Heating System**—U. S. Airco copper heating coils. Can be used with hot water.

**Controls**—Thermostatic expansion valve, thermostat, humidistat, liquid line solenoid valve, water regulating valve, air by-pass dampers.

Model No.	Price	Surfaces Sq. Ft.	Refrigeration Capacity—	Net Weight	Compressor Speed (R.p.m.)	Motor Hp.	Refrigerant	Motor Hp.	Speed R.p.m.	Blower Diameter In.	Total C.f.m.	Velocity F.p.m.	Heating Capacity B.t.u.	Humidification Lbs./hr.	Overall Dimensions
		Cool Heat	Dehumidification Sensible Heat Total												
<b>Self-Contained Floor Type</b>															
Dri-Cool	\$.....	.....	.....	12,000 to 1,200,000	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	52 x 30 x 28
<b>Floor Type</b>															
Dri-Cool	\$.....	.....	.....	12,000 to 1,200,000	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	30 x 40 x 13
<b>Suspended Type</b>															
Refrigerated Kooler-Aire	\$.....	.....	.....	12,000 to 1,200,000	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	16 x 14 x 10
<b>Duct Type</b>															
Refrigerated Kooler-Aire	\$.....	.....	.....	12,000 to 1,200,000	.....	.....	Freon	.....	.....	.....	.....	.....	.....	.....	.....

## Carraway

Carraway Engineering Co., Inc.  
Dallas, Tex.

Carraway builds a complete, year-round central air-conditioning system adaptable to the application. It has a positive type blower, driven by A and V-type belts. On vertical models the air intake is in the base of the conditioner, in horizontal models, it is in one end. The vertical models discharge the conditioned air from the top, the horizontal models from the other end. Uniflo grilles are used. Provision is made for fresh air intake. Cooling is by direct expansion. Copper tubing is used for standard

coil assemblies, steel and aluminum coils are used for special applications. Copper tubing is also used for the heating coils with cast-iron headers.

Three different cooling coil assemblies are provided, with a range of from 36,000 to 180,000 B.t.u.'s per hour. Heating is by forced hot water circulating system in six different capacity ranges from 70,000 to 350,000 B.t.u.'s. Steam is used on special application only.

An atomizer-type humidifier, actuated by a thermostat and solenoid valve, is employed. Water used for humidifying is at 70° F. Dry filters are used for cleaning.

Control devices are specially designed by the Carraway Engineering Co.

## McQuay

McQuay, Inc.  
Minneapolis, Minn.

Suspended-type units for cooling and dehumidifying functions, made in five different sizes. Complete coil assemblies for duct-type air-conditioning systems.

## Mellish & Murray

Mellish & Murray  
Chicago, Ill.

Special duct-type conditioners per-

forming all functions. Trane heating and cooling coils used. Cooling coils suitable for Freon, carbon dioxide, or ammonia as refrigerant. Cold water can also be used.

## Young Radiator

Young Radiator Co.  
Racine, Wis.

Young Radiator Co. manufactures air-conditioning equipment for particular applications, but does not carry stock units. The Young units can be built to accomplish all five functions of cooling, dehumidifying, heating, humidifying, and cleaning.

## Scott-Newcomb

Scott-Newcomb, Inc.  
St. Louis, Mo.

Scott-Newcomb builds a duct-type conditioner which performs all the functions of a year-round conditioner when it is connected with a refrigeration system. It comes in two models, one oil fired and the other gas fired. A belt-driven blower, with a ¾ or 1½-hp. motor, supplies from 1,500 to 2,000 c.f.m. Spray or pan type humidification is furnished. Cleaning is by American or Dustop filters. Controls include thermostat, humidistat and water regulating valve.



## Service Instructions On 'Socold' Unit

(Concluded from Page 27, Column 3)  
leaks and put compressor in service as was done when cleaning valves.

### Compressor Seal

Just as a refrigerating system is no better than its compressor, a compressor is no better than its gas seal. It is a simple matter to make joints in the tubing and at valves that are gas tight and will remain so indefinitely, because once made up they are not moved or disturbed; but where the drive shaft of a compressor extends through the cylinder base, some packing method (seal) must be used that will prevent the gas from leaking out along the oscillating shaft. The seal should automatically take up for wear.

The outstanding difficulty, that the manufacturers of compressors have had has been the inability of the general stuffing-box method of packing, to remain gas tight, for any extended length of time.

The design of "Socold" eliminates gas seal troubles. The seal is most simple and rugged and actually improves with use.

The "Socold" compressor is built around the seal, which makes the seal an integral part of the compressor and not an afterthought or attachment, which will require attention.

In a shoulder on the drive shaft is cut a series of concentric grooves. This shoulder runs against a babbitt plate of a special composition, and because of the construction which is to be found in "Socold," the drive shaft, instead of revolving at a relatively high speed, as is the common practice, oscillates on an arc of but 12 to 15 degrees, each side of center, for each complete revolution of the fan pulley. This shaft, rocking back and forth at a very low speed, practically makes this a non-moving seal.

The drive shaft is held securely against the babbitt plate by a heavy spring C-99. To minimize wear, this spring bears against a large ball at each end.

A point not to be overlooked is that the longer the machine runs, the more perfect becomes the fit between the steel shoulder and the babbitt, which makes the seal actually improve or become tighter with use. It automatically keeps sealed. This is because the rocking movement of the steel shoulder against the babbitt is very similar to the action employed in grinding-in valves, the longer it is continued the better the fit.

The seal, for further protection, is always immersed in oil, as the cylinder base contains three pints of refrigerating oil.

### Condenser

The condenser is mounted on the same base with the compressor. It is equipped with two valves, the one connected to the top turn is valve No. 2 and the one connected to the lower end is valve No. 3.

The compressor pumps the warm gas into the top of the condenser, where because of the draft of air from the fan wheel, it gradually becomes cool, thereby condensing and

## Mercoide Thermostat

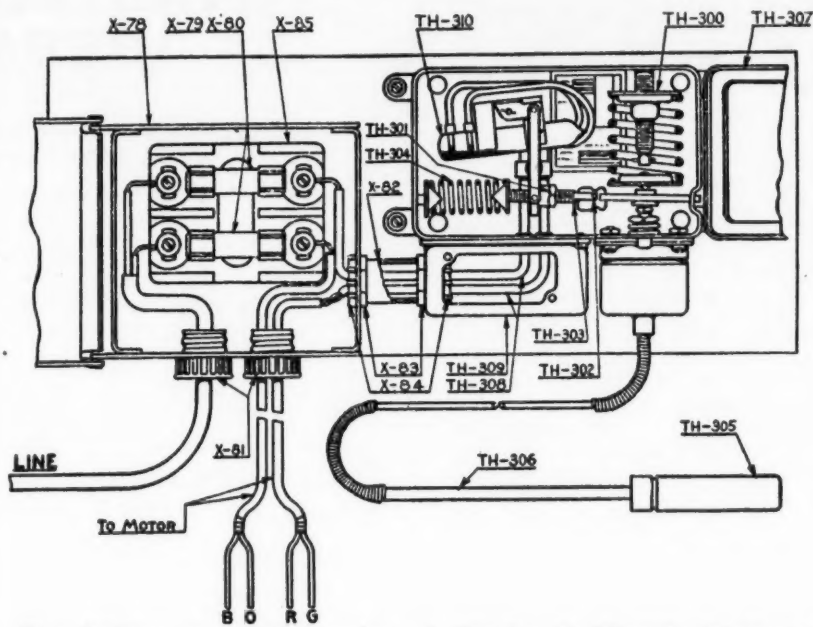


Fig. 6—Cross sectional drawing of the Socold Mercoide thermostat.

filling the lower section with liquid SO<sub>2</sub>.

When a system is refrigerating properly, the top of the condenser will be warm and the bottom slightly cooler.

For cabinets Nos. 26, 27, 36, 37, and remote installations No. 19, the condensers contain 5 pounds; for cabinets Nos. 46, 47, and remote installations No. 18, they have 6 pounds; and for cabinets Nos. 56, 57, and remote installations No. 17, they have 9 pounds.

### To Exchange Condenser

If gas is low, because of leaks, or if air and moisture have been allowed to enter the system, it is usually better to change the condenser, rather than add gas.

To change condenser, close lower valve No. 3 and start compressor.

Run the compressor until the gauge shows a deep vacuum. During this run, keep the doors of the refrigerator open, to help speed up the process. Even with this precaution it will take from 2 to 3 hours to get the gas back into the condenser, although if much gas has been lost this time will be materially reduced.

Keep the compressor running and close valves Nos. 4 and 7 at the frost unit, No. 8 at the compressor, and No. 2 at the condenser in the order named. Stop motor. Disconnect old condenser and put on the new one.

(Note: When the condenser is disconnected, air will enter the top section of the compressor and also the 1/4 inch tubing that runs between valve No. 3 of the condenser and valve No. 4 of the frost unit; but if valves Nos. 4, 7, and 8 were properly closed, air cannot get into the frost unit or the return 1/2 inch tubing between valves Nos. 7 and 8).

With the new condenser in place, pump the air out of the compressor, and make up the No. 23 connector which joins the compressor to valve No. 2, following the instructions given under cleaning compressor valves.

The 1/4 inch tubing going up to the expansion valve must be purged of air in the following manner. Make up the 1/4 inch connection to valve No. 3 and loosen the 1/4 inch connection to valve No. 4. Open the valve of No. 3, one-fourth turn and quickly close again. This allows SO<sub>2</sub> to enter the 1/4 inch tubing, and will push the air ahead of it out through the loose connection of valve No. 4.

When the gas escapes at the loose connection at valve No. 4 tighten this connection.

After all joints are tested for leaks, restart the system by opening all valves and starting the motor.

### Thermostat

The Mercoide is used in the "Socold" and is enclosed for protection.

Thermostat is mounted in the base of cabinet, which simplifies the wiring and makes it possible to keep all electrical connections out of the refrigerator.

The bulb TH-305 of the thermostat tube is inserted in a holder cast for it in the frost unit, and the small tube is run neatly down the back of the chest. This means that machine is controlled by the temperature of the frost unit and not by the food compartment temperature, which guarantees a constant supply of ice cubes without making seasonal adjustments necessary.

### Installation and Operation

This instrument has been carefully assembled and adjusted at the factory. It will operate accurately over its range when properly installed. It should be handled with the care to which an instrument of close accuracy is entitled.

### Location and Installation

Mercoide thermostat must be installed in a horizontal position as shown in the drawing above. If installed too far from the horizontal line, the mercury cannot flow from side to side of the mercury tube TH-310 when tilted.

### To Change Operating Point

To change the operating point, turn the spring cap TH-300 up or down. Turn down to obtain higher temperature. Turn up to obtain lower temperature.

### To Change Operating Differential

The "operating differential" is the difference in temperature between the "on" and "off" operations at any set operating point.

Loosen nut TH-301. Insert a nail or piece of wire in the hole TH-302 of adjusting screw TH-303. To increase differential, turn adjusting screw in, increasing compression of differential spring TH-304. To decrease differential, turn adjusting screw out, decreasing compression of spring TH-304. Be sure to retighten locknut TH-301.

### Connecting the Mercoide (Electrically)

As shown in Fig. 6, the cabinet models are equipped with a metal box, which contains the fuses and provides space for the splices in wires.

Be sure to use the proper size fuses, namely 6 amperes for motors connected for 110 volts and 3 amperes for motors connected for 220 volts.

The Mercoide control employs a mercury switch of the single-pole type, and should therefore be connected in one side of the circuit only. As shown in the drawing, one side of the circuit feeds the thermostat, the other side of the circuit feeds the motor, the remaining wire from the thermostat is then connected to the motor.

In remote installations, the underwriter's rules must be followed, in that the grounded or white wire of the circuit must feed the motor and then ungrounded or black wire must feed the thermostat. In remote installations where the fuses and cutout box would naturally be near the motor the wire box TH-309 is provided for the accommodation of splices.

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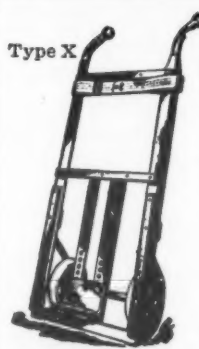
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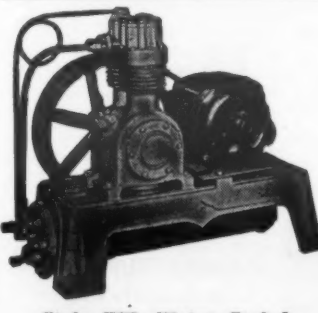


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We believe that every manufacturer, distributor, and dealer in the field will agree that a properly trained man is one of the industry's greatest assets. For that reason, we believe also, that employer and employee alike . . . in factories, shops and stores . . . should learn more about this new kind of training and learn too, how it can serve them.

Please address your request for information to me personally, care of the Refrigeration and Air Conditioning Institute, Inc., 2130-2158 Lawrence Avenue, Chicago.

*Ray D. Smith*  
PRESIDENT

REFRIGERATION & AIR CONDITIONING INSTITUTE - CHICAGO

### THE STAMP OF APPROVAL

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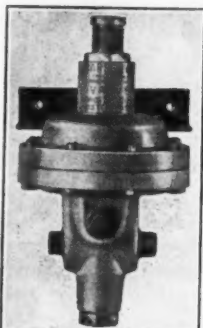
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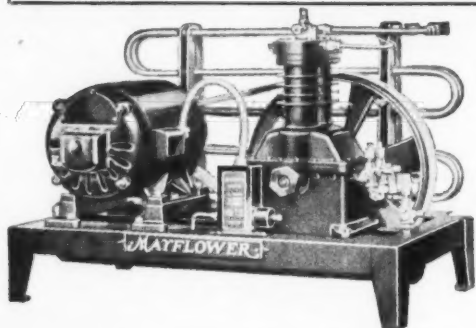
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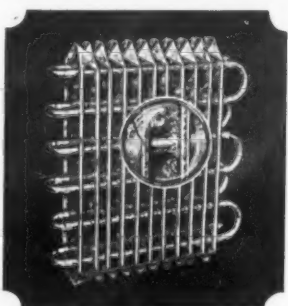
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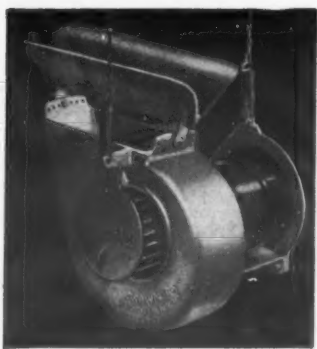
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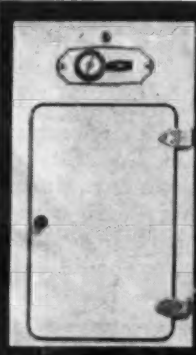
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## 'Detroit' Valves Now Use Gas-Charged Power Element

(Concluded from Page 1, Column 3)

the advantages of the valve with the gas-charged power element are as follows: eliminates motor overload on starting, limits maximum load under extreme conditions, can be dehydrated, insures tight closing of valve during shutdown under adverse conditions.

With the former liquid charge, says Mr. Knudson, the pressure exerted by the power element always increased in relation with the temperature, warm temperatures resulting in high suction pressures.

Extreme conditions, he points out, often caused overloading of the compressor motor with resulting failure or opening of the overload protection. The liquid charged valves could not be dehydrated as the heat developed excessive pressures in the power element.

With the new method of charging only a small amount of vapor is used. During operation the vapor condenses and develops pressure in accordance with the temperature.

When the temperature increases above a pre-determined point, however, a small amount of vapor turns into a superheated gas. When this condition is reached the pressure no longer increases in accordance with the temperature but remains practically constant regardless of how high the temperature rises.

Amount of vapor charged into the power element is determined by the pressure used during the charging process. Accurate control of the maximum operating pressure is thereby obtained at the time the power element is charged.

In the operation of the valve the pressure in the power element tends to open the needle but is opposed by the pressure in the valve body.

When the compressor reduces the suction pressure in the system down to the desired maximum the needle opens and the valve then maintains

## INSTALLATION OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN INSTALLATION WORK

### No. 6—Making a Bend with the Handy (Mechanical) Tube Bender

By K. M. Newcum

#### TOOLS NEEDED:

Handy tube bender.

#### MATERIAL NEEDED:

One piece of 1/2-inch tubing 18 inches long.

#### PROCEDURE:

1. Straighten tubing perfectly straight.
2. Remove gear wheel from tube bender.
3. Insert tubing in tube bender.
4. Mark tubing where bend is to be made.
5. Move tubing in bender until mark extends 1/4 inch beyond guide in tube bender.
6. Replace gear wheel and insert pins.
7. Place hook over tubing.
8. Turn handle, bending to 90 degree bend.
9. Remove bender from tubing.
10. Check with instructor.

### Penn Switch Plans Series Of Field Meetings

DES MOINES — Penn Electric Switch Co. will hold a series of dealer luncheon meetings on automatic heating controls this summer in the major markets of the United States.

### Illinois & Pennsylvania Lead in March Sales

States and Territories	Quantity Household Low Sides
Alabama	2,971
Arizona	752
Arkansas	1,712
California	10,708
Colorado	1,756
Connecticut	2,535
Delaware	577
Dist. of Columbia	1,436
Florida	2,318
Georgia	2,515
Idaho	732
Illinois	23,458
Indiana	5,178
Iowa	3,634
Kansas	3,337
Kentucky	2,174
Louisiana	1,962
Maine	971
Maryland	3,211
Massachusetts	6,719
Michigan	8,718
Minnesota	2,394
Mississippi	1,021
Missouri	7,639
Montana	571
Nebraska	1,957
Nevada	150
New Hampshire	678
New Jersey	8,568
New Mexico	419
New York	16,301
North Carolina	3,189
North Dakota	471
Ohio	13,784
Oklahoma	2,460
Oregon	1,614
Pennsylvania	19,102
Rhode Island	927
South Carolina	1,274
South Dakota	791
Tennessee	2,979
Texas	6,960
Utah	821
Vermont	441
Virginia	3,370
Washington	3,689
West Virginia	1,814
Wisconsin	3,190
Wyoming	304
Total United States	194,252
Total Canada	1,726
Other Foreign (Incl. U. S. Possessions)	11,553
Total for World	207,531

## New Valve Cuts Motor Overload

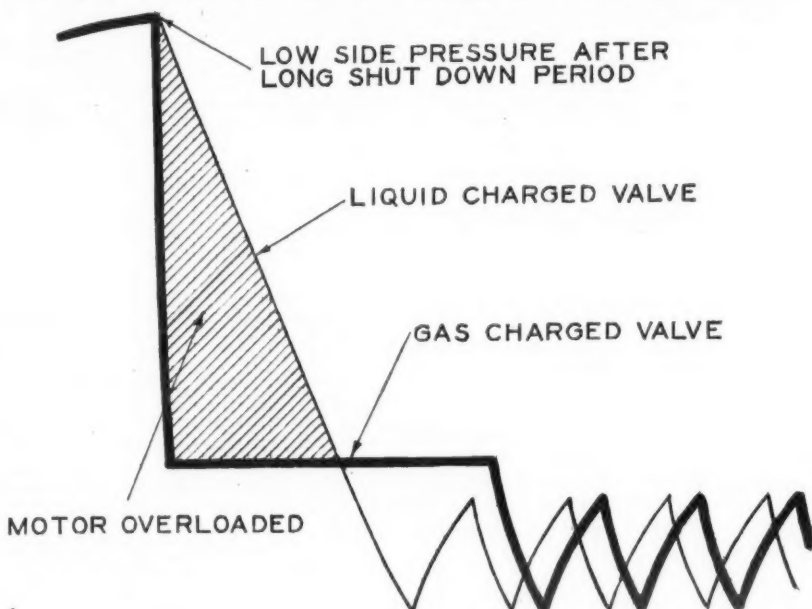


Fig. 1—This performance chart shows the pull down characteristics of a gas charged expansion valve as compared with a liquid charged valve.

the desired maximum pressure exactly like an automatic expansion valve would.

When the compressor has operated long enough to cool the entire evaporator, cold refrigerant reaches the sensitive bulb attached to the suction line. When this bulb is cooled some of the gas charge condenses into a liquid. The valve then functions exactly like the liquid charged valve and keeps the entire coil refrigerated.

Fig. 1 shows the pull down characteristic of the gas charged valve as compared to a valve with a liquid charge. Note that the heavy line representing the gas charged valve drops quickly and avoids overloading the motor.

Mr. Knudson says that gas charged valves are carried in stock for maximum operating pressures of 25 lbs. sulphur dioxide, 35 lbs. methyl chloride, and 45 lbs. Freon.

### Krackowizer Names Hess to Sales Staff

CHICAGO—Herbie Hess, sales engineer with the Carrier Engineering Corp., has resigned his position with that organization to assume new duties as division sales manager of Refrigeration Appliances, Inc., finned coil manufacturer, announces H. J. Krackowizer, president.

Mr. Hess has been associated with the refrigeration industry for the past 20 years, and gained his early experience with the Creamery Package Mfg. Co.

### Leeds & Northrup Explains Use of Thermometers

PHILADELPHIA—Leeds & Northrup Co. has issued a booklet on the application of electrical thermometers to regulate an air-conditioning system.



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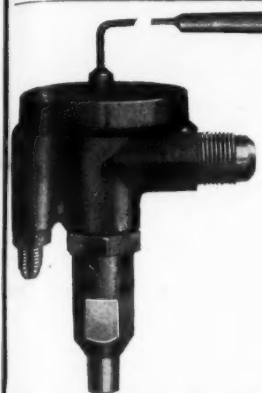
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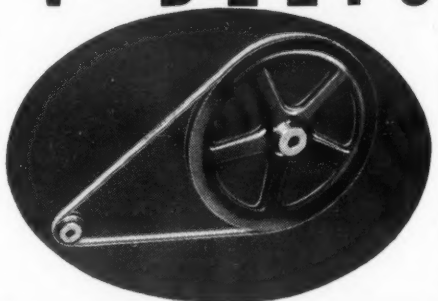
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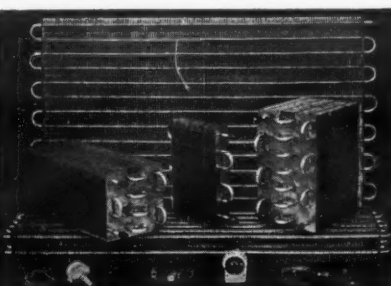
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	Electric Refrigeration News (weekly)	1935 Refrigeration Directory and Market Data Book (2 volumes)	Both Electric Refrigeration News and Refrigeration Directory
1 subscription	\$3.00	\$5.00	\$8.50
5 or more each	2.75	4.50	8.50
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5-22-35

## QUESTIONS

### Parts Distributors

No. 2248 (Manufacturer, Wisconsin)—“In my letter of April 22, I evidently did not make myself clear. The list I am interested in securing is a list of distributors of refrigeration equipment such as compressors, condensers, etc.”

“Of course, we have no interest in household refrigerators. I am returning to you the list which you so kindly sent me, as I feel you may wish to use this again.”

Answer: We have no available list of distributors of refrigerator compressors, condensers, or other parts.

Our 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY lists all manufacturers of compressors, condensers, cooling units, and all component parts used in the manufacture of refrigeration machines, and also includes a number of companies acting as jobbers of parts, materials, and supplies.

### Holmes Service Parts

No. 2249 (Dealer, Ohio)—“Will you please advise us where we can get parts for the Holmes refrigerator units, or where we can send same to get repaired?”

Answer: Holmes Products, Inc., which formerly manufactured the Holmes refrigerator, has been out of business for several years, and we know of no company manufacturing parts for these refrigerators.

However, we suggest that you write to the following companies, stating your needs:

The Harry Alter Co.

1728 S. Michigan Ave., Chicago, Ill.

Melchior, Armstrong, Dessau Co.

300 Fourth Ave., New York City.

Utilities Engineering Sales Co.

410 N. Wells St., Chicago, Ill.

Iceless Refrigeration Accessories Co.

2401 Chestnut St., Philadelphia, Pa.

William M. Orr Co.

1228 Brighton Rd., Pittsburgh, Pa.

H. W. Blythe Co.

2334 S. Michigan Ave., Chicago, Ill.

Carl John Stein Co.

122 W. Illinois St., Chicago, Ill.

McIntire Connector Co., Newark, N. J.

Refrigeration Service, Inc.

3109 Beverly Blvd., Los Angeles, Calif.

These companies are all large

jobbers of refrigeration parts, and

some one of them may have a stock

of parts for Holmes refrigerators.

Answer: We do not have it.

### Vegetable Pans

No. 2251 (Dealer, Texas)—“Please advise from whom we might purchase sliding type vegetable pans, top of which fastens to refrigerator shelf, and pan sliding out.”

Answer: Manufacturers of vegetable pans for household electric refrigerators are listed on page 255 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

### Newcum's Articles

No. 2252 (Distributor, New York)—“Since the April 10 issue, I have noticed some very interesting and educational articles by K. M. Newcum on service, outlining fundamentals of refrigeration, etc.”

“Will you kindly advise if this information is available in booklet form and is so, what the cost of this information would be per copy.”

Answer: We are planning to reprint all of this material in book form later, but it will be some time before the series is completed and the book ready for distribution.

### Cabinet Hardware

No. 2253 (Dealer, New Jersey)—“We purchased an Illinois cabinet about four years ago on which the latch is broken. We understand the manufacturers are out of business, and would appreciate very much if you would advise from whom we may purchase a latch to replace the broken one mentioned above.”

Answer: Midwest Stamping & Enameling Co. is now manufacturing refrigerator cabinets in the plant at Morrison, Ill., formerly operated by the Illinois Refrigerator Co., and may be able to supply the latch.

Manufacturers of hardware for household refrigerator cabinets are listed starting on page 230 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Kason Hardware Corp., 127 Wallabout St., Brooklyn, N. Y., has recently announced that it is manufac-

turing replacement hardware for “orphan” makes of refrigerators.

### Refrigerant for an ‘Orphan’

No. 2254 (Dealer, Pennsylvania)—“Can you furnish me with the following information?”

“I wish to put in service for a customer his Holmes electric refrigerator and this job needs gas and I find that ethyl chloride gas is no longer being made and I wish to know if it is possible to use methyl chloride in this job.”

“This refrigerator was manufactured by the Holmes Product Inc., Bridgeport, Conn.”

Answer: Ethyl chloride gas may be obtained from Dow Chemical Co., Midland Mich.; Matheson Co., East Rutherford, N. J.; and R. & H. Chemicals Dept., E. I. DuPont de Nemours & Co., Inc., Wilmington, Del.

Instructions for servicing the Holmes refrigerating unit were published in the October 10, 17, and 24, 1934 issues of ELECTRIC REFRIGERATION NEWS.

### Specifications for Past Years

No. 2255 (Service Man, Pennsylvania)—“Will you please tell me where I may obtain information covering all makes of refrigerators old and new, or do you think that I should get same from each manufacturer, I want complete information regarding each make, model, and year refrigerator.”

Answer: ELECTRIC REFRIGERATION NEWS started to publish specifications of household electric refrigerators in 1932 and has published them in each succeeding year.

Back issues of ELECTRIC REFRIGERATION NEWS may be obtained at a cost of 10 cents each.

### Association Secretary

No. 2256 (Manufacturer, Illinois)—“We would appreciate your advising the name and address of the Secretary of the Refrigerator Manufacturers Association.”

Answer: Haldeman Finnie is manager of the Refrigeration Division of the National Electrical Manufacturers Association. His office is located at 1106 Penobscot building, Detroit, Mich.

Paul H. Sullivan is secretary of the Commercial Refrigerator Manufacturers Association with offices at 111 West Washington St., Chicago, Ill.

W. B. Henderson is executive vice president of the Refrigerating Machinery Association with offices at 1915 Southern Building, Washington, D. C.

### Sales by Districts

No. 2257 (Magazine, California)—“Sometime ago we saw a notation regarding the sale of electric refrigerators on the Pacific Coast compared to the sale of electric refrigerators throughout the country.”

“We would like very much to have these sales figures up to date, and if possible compared to the corresponding period in 1934.”

Answer: We assume that you have in mind the sales of household electric refrigerators by states, compiled by the Refrigeration Division of the National Electrical Manufacturers Association each month and published in ELECTRIC REFRIGERATION NEWS.

Figures for January, 1934, were published in the March 14, 1934 issue, and for February, 1934, in the April 4, 1934 issue. Figures for January, 1935 were published in the March 13, 1935 issue, and for February, 1935, in the May 1, 1935 issue.

### Makers of Accessories

No. 2258 (Manufacturer, Quebec)—“Kindly supply me with the manufacturer's address of the following:

“Metiflex individual ice cube trays, the Aluminum Goods Manufacturing Co., the manufacturer's name of Mirro defrosting trays, the manufacturer's name of glass defrosting trays, and the manufacturer's name of refrigerator shelves.”

Answer: Metiflex ice cube trays are manufactured by McCord Radiator & Mfg. Co., 2587 East Grand Blvd., Detroit, Mich.

The Aluminum Goods Mfg. Co. is located at Manitowac, Wis., and we believe that this company makes Mirro defrosting trays.

Manufacturers of glass defrosting trays are listed on pages 253 and 254 of the REFRIGERATION AND AIR CONDITIONING DIRECTORY. Manufacturers of refrigerator shelves are listed on page 234 of the same volume.

### List of Manufacturers

No. 2259 (Reader, Montana)—“As I am graduating from the O. F. Shoock School at Alton, Ill., I will soon be ready to seek employment in the refrigeration field.”

“Would you kindly furnish me with a list of names and addresses of the firms in this industry in the United States.”

Answer: Manufacturers of household electric refrigerators are listed on pages 235 and 248 of the REFRIGERATION AND AIR CONDITIONING DIRECTORY.

## CLASSIFIED

RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

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### POSITIONS AVAILABLE

WANTED, WORKSHOP FOREMAN (willing to go to foreign country) thoroughly experienced in manufacturing and production of domestic and commercial refrigerators, compressors, evaporators, cabinets, etc. Address reply to attention A. D. Mintz, Carr Brothers, Inc., 120 Broadway, New York.

REFRIGERATION Engineer familiar with commercial compressors, coils, display cases, coolers, etc. Capable of running tests, installations of various refrigerants and multiple hookups. With reliable concern. Box 687, Electric Refrigeration News.

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RURAL REFRIGERATION, national representative available. I pioneered the most prominent refrigerator for farm and rural use; know where the markets of this great and barely scratched field are. Capable of handling national sales or would be valuable as field assistant. At present employed in refrigeration in an executive sales capacity. Box 704, Electric Refrigeration News.

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